SITE ENGINEERING CONSULTANTS
850 Middle Tennessee Blvd Murfreesboro, Tennessee 37129
Ph. 615-890-7901 FAX 615-895-2567

RECEIVED

SEC, Inc.

LETTER OF TRANSMITTAL

SEP 13 2011

Municipal Facilities

Date: 9-12-11 **TO:** Mr. Wade Murphy

Project : Arrington Vineyards — TDEC-WPC – Permit Section

Project No.: 11030 — 401 Church St., L&C Annex 6th floor

Re: Step System (Williamson County) — Nashville, Tn 37243-1534

WE ARE SENDING YOU THE ATTACHED VIA courier THE FOLLOWING:

☐ **Shop Drawings** ☐ **Original Plans** ☑ **Plan Prints** ☐ **Specifications**

☑ **Copies** ☐ **Other**_____

NO.	COPIES	DATE	DESCRIPTION
1	1	9-7-11	SOP application / Report
2	1	5-26-11	Prel. Engineering Report
3	1	5-19-11	WPC Mapping

These are transmitted as checked: ☑ For approval ☐ For your use ☐ As requested ☐ For review and comment

☐ Approved as submitted ☐ Approved as noted ☐ Returned for corrections ☐ Resubmit_____copies for approval
☐ Submit___ copies for distribution ☐ Return ___ corrected prints ☐ Prints returned after loan to us
☐ Other _____

Remarks: I also sent packages to Bob Odette and Scotty Sorrels. Let me know if you have any questions.

CC:**Bob Odette**
Scotty Sorrels

Signed *Jamie Reed P.E., R.L.S.*

Permit Number: SOP-_____

Type of application: ☒ New Permit ☐ Permit Reissuance ☐ Permit Modification

Permittee Identification: (Name of city, town, utility, industry, corporation, individual, etc., applying, according to the provisions of Tennessee Code Annotated Section 69-3-108 and Regulations of the Tennessee Water Quality Control Board.)	
Permittee Name (applicant):/Facility Name	**Russell/Brooks LLC** **Facility: Arrington Vineyard & Russell/Brooks Property**
Permittee Address:	**6211 Patton Road** **Arrington,, TN 37014**

Official Contact: **John C. Russell**	Title or Position: **President**		
Mailing Address: **1400 18th Avenue South**	City: **Nashville**	State: **TN**	Zip: **37212**
Phone number(s): **615-812-7903**	E-mail: **jrusselltn@gmail.com**		

Optional Contact: **Kip Summers**	Title or Position: **Manager**		
Address: **6211 Patton Road**	City: **Arrington**	State: **TN**	Zip: **37014**
Phone number(s): **615-924-1636**	E-mail: **kip@arringtonvineyards.com**		

Application Certification (must be signed in accordance with the requirements of Rule 1200-4-5-.05)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and title; print or type	Signature	Date
John C. Russell	John C. Russell	**08/21/2011**

OFFICIAL STATE USE ONLY

Received Date	Permit Number	Field Office	Reviewer
	SOP		

Permit Number: SOP-_____

Facility Identification:		**Existing Permit No.**	
Facility Name:	**Arrington Vineyard & Russell/Brooks Property**	County:	**Williamson**
Facility Address or Location:	**6211 Patton Road** **Arrington, Tennessee 37014**	Latitude:	**35-50'-30"**
		Longitude:	**86-41'-30"**

Name of Engineer for the project: Initial Engineer: **Jamie Reed, SEC, Inc.**

Engineer address and phone number: **850 Middle Tennessee Blvd. Murfreesboro, TN 37129 PH 615-890-7901**

Name and distance to nearest receiving waters: **2,200' from the confluence of Nelson Creek and the Harpeth River**

If any other State or Federal Water/Wastewater Permits have been obtained for this site, list their permit numbers:
#27011 Process Wastewater – Williamson County Department of Sewage Disposal Management
#27012 Domestic Wastewater – Williamson County Department of Sewage Disposal Management

Name of company, utility, or governmental entity that will operate the permitted system: **IRM-C&C Company**

Operator address: **Jeffrey W. Cox, Sr. PO Box 645, White Pine, TN 37890**

Has the owner/operator filed for a Certificate of Convenience & Necessity (CCN), or an amended CCN, with the Tennessee Regulatory Authority (TRA) (may be required for collection systems and land application treatment systems)? ☐ Yes ☐ No ☒ N/A

If the applicant listed above does not yet own the facility/site or if the applicant will not be the operator, explain how and when the ownership will be transferred or describe the contractual arrangement and renewal terms of the contract for operations. **N/A**

Name of Public Water Provider: **Utility Water is available by Milcrofton Utility District**

List Standard Industrial Codes (SIC)/ North American Industrial Code (s) (NAIC) for proposed activity (these are located at http://www.census.gov/epcd/www/naicstab.htm) **221**

Complete the following information explaining the entity type, number of design units, and daily design wastewater flow:

Entity Type	Number of Design Units		Flow (GPD)
☐ City, town or county	No. of connections:		
☐ Subdivision	No. of homes:	Avg. No. bedrooms per home:	
☐ School	No. of students:	Size of cafeteria(s): No. of showers:	
☐ Apartment	No. of units:	No. units with Washer/Dryer hookups: No. units without W/D hookups:	
☒ Commercial Business	No. of employees: **10**	Type of business: **Winery Process & Tasting/Sales**	**1,250**
☐ Industry	No. of employees:	Product(s) manufactured:	
☐ Resort	No. of units:		
☐ Camp	No. of hookups:		
☐ RV Park	No. of hookups:	No. of dump stations:	
☐ Car Wash	No. of bays:		
☒ Other	**Wedding Facility**	**Weddings and Receptions - Meetings**	**1954**

Describe the type and frequency of activities that result in wastewater generation.

Typical residential domestic sewage and winery process wastewater. Design flow will be for 7,100 GPD

Permit Number: SOP-_____

Engineering Report (required for collection systems and/or land application treatment systems):	☐ N/A
☒ Prepared in accordance with Rule 1200-4-2-.03 and Section 1.2 of the Tennessee Design Criteria (see website for more information)	
☒ Attached, or	
☐ Previously submitted and entitled: Approved? ☐	☐ No

Wastewater Collection System:	☐ N/A
System type (i.e., gravity, low pressure, vacuum, combination, etc.): **STEP Pressure system.**	
System Description: **2" PVC low pressure force main**	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): **Pump tanks are equipped with audible and visual alarms. Floats are set up for free board in the pump tank for 3-4 days of power failure storage and service reaction timing. Facility will close during power outages.**	
In the event of a system failure describe means of operator notification: **Telephone telemetry and audible/visual alarms.**	
List the **emergency** contact(s) (name/phone): **same**	
For low-pressure systems, who is responsible for maintenance of STEP/STEG tanks and pumps or grinder pumps (list all contact information)? **IRM C&C Company** **Jeffrey W. Cox, Sr. Licensed B&S Operator and Collection System Operator**	
Approximate length of sewer (excluding private service lateral): **Less than 500'**	
Number/hp of lift stations: **N/A** / Number/hp of lift pumps **N/A** /	
Number/volume of low pressure and or grinder pump tanks 3-4 / 1000-1500 gal. Number/volume septic tanks 3-4 / 1000-1500 gal.	
Attach a schematic of the collection system. ☒ Attached	
If this is a satellite sewer and you are tying in to another sewer system complete the following section, listing tie-in points to the sewer system and their location (attach additional sheets as necessary):	

Tie-in Point	Latitude (xx.xxxx°)	Longitude (xx.xxxx°)
N/A		

Land Application Treatment System:	☐ N/A
Type of Land Application Treatment System: ☒ Drip ☐ Spray ☐ Other, explain:	
Type of treatment facility preceding land application (recirculating media filters, lagoons, other, etc.): Recirculating fixed film media filter with uV disinfection.	
Attach a treatment schematic. ☒ Attached	
Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.): **System is water tight eliminating I&I. Free board volume provides surge flow protection and equalization.**	

Permit Number: SOP-_____

For New or Modified Projects:
Name of Developer for the project: Arrington Vineyards Real Estate & Russell/Brooks Property LLC
Developer address and phone number: Same

For land application, list: ☒ Proposed acreage involved: **0.65 acres** ☒Inches/week or GPD/SF loading rate to be applied: **0.25 gal/sqft/day**

Is wastewater disinfection proposed? Yes with Ultra-violet Disinfection.

☐ Yes To be fenced. Limited remote.

☐ No Describe how access to the land application area will be restricted: **To be fenced.**

Attach required additional Engineering Report Information (see website for more information)

☒ Topographic map (1:24,000 scale presented at a six inch by six inch minimum size) showing the location of the project including quadrangle(s) name(s) GPS coordinates, and latitude and longitude in decimal degrees should also be included.

☒ Scaled layout of facility showing the following: lots, buildings, etc. being served, the wastewater collection system routes, the pretreatment system location, the proposed land application area(s), roads, property boundaries, and sensitive areas such as streams, lakes, springs, wells, wellhead protection areas, sinkholes and wetlands.

☒ Soils information for the proposed land disposal area in the form of a Water Pollution Control (WPC) Soils Map per Chapter 16 and 17 State of Tennessee Design Criteria for Sewage Work. The soils information should include soil depth (borings to a minimum of 4 feet or refusal) and soil profile description for each soil mapped.

☒ Topographic map of the area where the wastewater is to be land applied with no greater than ten foot contours presented at a minimum size of 24 inches by 24 inches. **11inches by 17 inches due to small size.**

☒ Describe alternative application methods based on the following priority rating: (1) connection to a municipal/public sewer system, (2) connection to a conventional subsurface disposal system as regulated by the Division of Groundwater Protection, and/or (3) land application.

For Drip Dispersal Systems Only: Unless otherwise determined by the Department, sewage treatment effluent wells, i.e, large capacity treatment/drip dispersal systems after approval of the SOP Application, will be issued an UIC tracking number and will be authorized as Permit by Rule per UIC Rule 1200-4-6-.14(2) and upon issue of a State Operating Permit and Sewage System Construction Approval by the Department. Describe the following: **A: DESRCIBED ON ATTACHMENT AND LABELED A-H (as marked below)**

The area of review (AOR) for each Drip Dispersal System shall, unless otherwise specified by the Department, consist of the area lying within a one mile radius or an area defined by using calculations under 1200-4-6-.09 of the Drip Dispersal System site or facility, and shall include, but not be limited to general surface geographic features, general subsurface geology, and general demographic and cultural features within the area. Attach to this part of the application a general characterization of the AOR, including the following: (This can be in narrative form)

B☒ A general description of all past and present groundwater uses as well as the general groundwater flow direction and general water quality.

C☒ A general description of the population and cultural development within the AOR;i.e. ☐ agricultural, ☐ commercial, ☐ residential or ☒ mixed.

D☒ Nature of injected fluid to include physical, chemical, biological or radiological characteristics.

E☒ If groundwater is used for drinking water within the area of review, then identify and locate on a topographic map all groundwater withdrawal points within the AOR, which supply public or private drinking water systems. Or supply map showing general location of publicly supplied water for the area(this can be obtained from the water provider)

F☒ If the proposed system is located within a wellhead protection area or source water protection area designated by Rule 1200-5-1-.34, show the boundary of the protection area on the facility site plan.

G☒ Description of system, Volume of injected fluid in gallons per day based upon design flow, including any monitoring wells

H☒ Nature and type of system, including installed dimensions of wells and construction materials

Pump and Haul: ☒ N/A

Reason system cannot be served by public sewer: **If necessary, pumping during the change-over will be performed.**

Distance to the nearest manhole where public sewer service is available: **POTW**

When sewer service will be available: **When permitted and constructed.**

Volume of holding tank: **1000** gal.

Tennessee licensed septage hauler (attach copy of agreement): **To be determined.**

Facility accepting the septage (attach copy of acceptance letter):

Latitude and Longitude (in decimal degrees) of approved manhole for discharge of septage: **N/A**

Permit Number: SOP-_____

Describe methods to prevent and respond to any bypass of treatment or discharges (i.e., power failures, equipment failures, heavy rains, etc.):
High Level Alarms

Holding Ponds (for non-domestic wastewater only):	☒ N/A
Pond use: ☐ Recirculation ☐Sedimentation ☐Cooling ☐Other (describe):	
Describe pond use and operation:	
If the pond(s) are existing pond(s), what was the previous use?	
Have you prepared a plan to dispose of rainfall in excess of evaporation? ☐ Yes ☐ No	
If so, describe disposal plan:	
Is the pond ever dewatered? ☐ Yes ☐ No	
If so, describe the purpose for dewatering and procedures for disposal of wastewater and/or sludge:	
Is(are) the pond(s) aerated? ☐ Yes ☐ No	
Volume of pond(s): gal. Dimensions:	
Is the pond lined (Note if this is a new pond system it must be lined for SOP coverage. Otherwise, you must apply for an Underground Injection Control permit.)? ☐ Yes ☐ No	
Describe the liner material (if soil liner is used give the compaction specifications):	
Is there an emergency overflow structure? ☐ Yes ☐ No	
If so, provide a design drawing of structure.	
Are monitoring wells or lysimeters installed near or around the pond(s)? ☐ Yes ☐ No	
If so, provide location information and describe monitoring protocols (attach additional sheets as necessary):	

Attach required additional Information

☐ Topographic map (1:24,000 scale presented at a six inch by six inch minimum size) showing the location of the project including GPS coordinates, latitude and longitude in decimal degrees quadrangle name should also be included.

☐ Scaled layout of facility showing the following: lots, buildings, etc. being served, the wastewater collection system routes, the pretreatment system location, roads, property boundaries, and sensitive areas such as streams, lakes, springs, wells, wellhead protection areas, sinkholes and wetlands.

The area of review (AOR) for each holding pond shall, unless otherwise specified by the Department, consist of the area lying within and below a one mile radius of the holding pond site or facility, and shall include, but not be limited to surface geographic features, subsurface geology, and demographic and cultural features within the area. Attach to this part of the application a complete characterization of the AOR, including the following: (This can be in narrative form)

☐ Description of all past and present uses of groundwater within the AOR, as documented by public record.

☐ Description of the groundwater hydrology within the AOR, including characteristics of all subsurface aquifers, presence or absence of solution development features, general direction of groundwater movement, and chemical characteristics of the ground waters in the AOR..

☐ Description of the population and cultural development within the AOR, including the number of persons living within one mile of the well or facility, land uses within the AOR, and the existence of any community, state, regional or national parks, wildlife refuges, natural or wilderness areas, recreational or other public-use areas, or any other environmentally sensitive features within the area of review.

Permit Number: SOP-_____

☐ If groundwater is used for drinking water within the area of review, then identify and locate on a topographic map all groundwater withdrawal points within the AOR, which supply public or private drinking water systems..

☐ Identify any surface water intake, which supplies a public water distribution system and is located within the AOR or within three miles topographically down gradient from the well or facility. If any such intake(s) wells or springs exist, then locate on map

Mobile Wash Operations: ☒ N/A

☐ Individual Operator ☐ Fleet Operation Operator

Indicate the type of equipment, vehicle, or structure to be washed during normal operations (check all that apply):

☐ Cars ☐ Parking Lot(s): sq. ft.

☐ Trucks ☐ Windows: sq. ft.

☐ Trailers (Interior washing of dump-trailers, or tanks, is prohibited.) ☐ Structures (describe):

☐ Other (describe):

Wash operations take place at (check all that apply):

☐ Car sales lot(s) ☐ Public parking lot(s)

☐ Private industry lot(s) ☐ Private property(ies)

☐ County(ies), list: ☐ Statewide

Wash equipment description:

☐ Truck mounted ☐ Trailer mounted

☐ Rinse tank size(s) (gal.): ☐ Mixed tanks size(s) (gal.):

☐ Collection tank size(s) (gal.): Number of tanks per vehicle:

Pressure washer: psi (rated) gpm (rated) Pressure washer: ☐ gas powered ☐ electric

Vacuum system manufacturer/model: Vacuum system capacity: inches Hg

Describe any other method or system used to contain and collect wastewater:

List the public sewer system where you are permitted or have written permission to discharge waste wash water (include a copy of the permit or permission letter):

Are chemicals pre-mixed, prior to arriving at wash location? ☐ Yes ☐ No

Describe all soaps, detergents, or other chemicals used in the wash operation (attach additional sheets as necessary):

Chemical name:	Manufacturer:	Primary CAS No. or Product No.

IRM – C&C Company

P.O. Box 645 · White Pine, Tennessee 37890 · Telephone (865) 674-0838 · Facsimile (865) 674-2352

Mr. Wade Murphy - Permit Section
Division of Water Pollution Control
6th Floor, L&C Annex - 401 Church Street
Nashville, TN 37243-1534

August 21, 2011

RE: Arrington Vineyard & Russell/Brooks Property – Williamson County
Permit Application Submittal with Preliminary Engineering Report

Dear Mr. Murphy,

IRM-C&C Company has enclosed the State Operating Permit Application and Preliminary Engineering Report for the above referenced property. The initial system has been installed for more than five years.

The initial system was approved by the Tennessee Department of Environment and Conservation, Division of Groundwater Protection, Williamson County Department of Sewerage Disposal Management. What is permitted and approved is the application of raw septic tank effluent into a subsurface sewage disposal system (low pressure pipe drain field trenches). We are under the impression that disposing of highly treated wastewaters as we have proposed here would be more environmentally friendly, less of an impact than the previous approvals, and superior for protecting the "Waters of the State".

Attached is documentation for the Drip Disposal Systems Only Section (Page 4) of this "Draft Application".

This submittal has been made by U.S. Mail and electronic mail. The final WPC Soil Map will be submitted in the next few days. Please call if you have any questions or need any further information. Thank you.

Sincerely,

Jeffrey W. Cox, Sr.

Drip Dispersal Systems, UIC Information

Supplement to SOP Application

Description of AOR

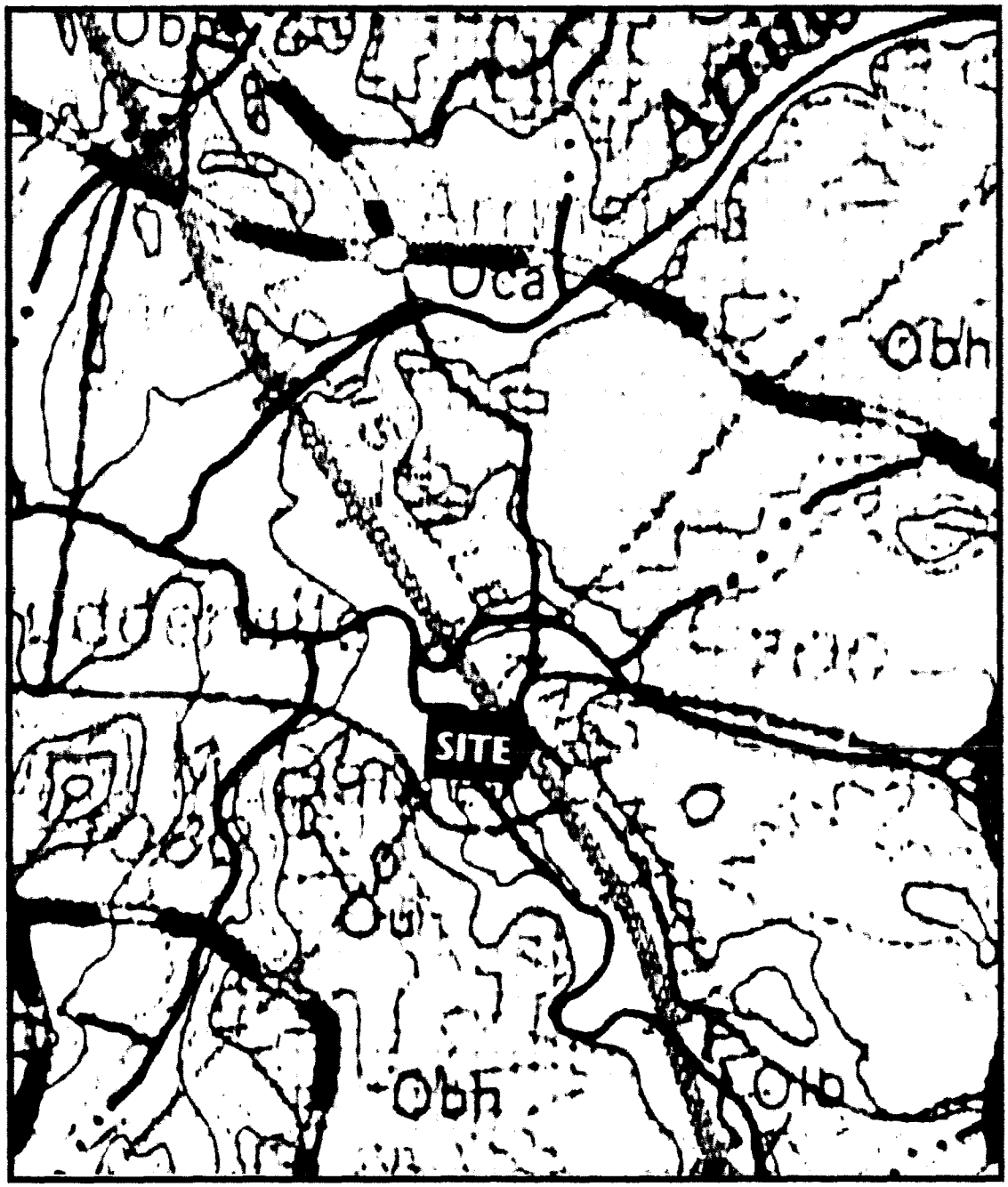
RE: Arrington Vineyards Real Estate & Russell/Brooks Property
Williamson County
SOP Permit Application

Items are marked and identified on Page 4 of the Permit Application alfa-numerically (A-H):

A. The Site is comprised of two parcels for a total of 92+ acres. The topography is mainly gently rolling to rolling slopes of 5 to 15 per cent with moderately steep areas making up less than 15% of the property. The maximum relief is 200 to 240 feet. The property is bordered to the North by Nelson Creek, to the West by Cox Road and to the South and East by agricultural property and large lot residential property. Roughly 15 percent of the Site is wooded and the 0.65 acre Drip Disposal Site (DDS) is cleared.

Soils are mainly residual loamy and clayey soils with remnants of alluvial soils in the hollows. Soils are Stiversville, Nesbitt, Hampshire and Inman. There are mainly Stiversville and Nesbitt Soils in the area of the DDS. The DDS area is 5-15 per cent slopes. There are many sink/depression areas in the AOR. No sink/depressions were mapped on the DDS area. The major geologic influence of the Site was determined from the Geology Map of Tennessee, East Sheet by William H. Hardeman, 1966, and is the Bigby-Cannon Limestone and Hermitage Formation (Obh) on the South and Carters Limestone (Oca) to the North and West along the first and second creek bottoms of Nelson Creek and the Harpeth River. A scanned (not to scale enlargement) copy of the Geology Map is on the next page.

Geology Map



B. The property prior to this agricultural and resort status use was used for agricultural purposes. Groundwater was used historically to provide agricultural and rural residential water. At this time the Utilities providing water to the area is the Milcrofton Utility District.

It is assumed that the groundwater movement is to the West and North toward Nelson Creek and the Harpeth River. The surface flows are also toward these tributaries.

C. The AOR has changed from mainly agriculture to light residential. There are many farms in the community. The area is still considered rural.

D. The effluent quality is typical of residential treated wastewaters that meet SOP Limits.

E. The area is served by The Milcrofton Utility District. There are wells in the AOR. Please advise IRM-C&C Company or the engineer if this log is needed.

F. The DDS area is not located within a wellhead protection area to the best of our knowledge.

G. The DDS is a typical drip dispersal system installed with pressure compensated drip tubing on five foot centers at a depth of 8 inches. The soils on the DDS will be able to treat 7,100 gallons per day based on the soil maps and the new design chapters. The initial system which was permitted by the Tennessee Department of Environment and Conservation, Division of Groundwater Protection, approved the application of raw septic tank effluent into a subsurface sewage disposal system (drain field trenches). We are under the impression that disposing of highly treated wastewaters as we have proposed here would be more environmentally friendly, less of an impact than the previous approvals, and superior for protecting the "Waters of the State". There are no monitoring wells planned.

H. The system is similar to a slow rate land treatment system but the effluent is dispersed via subsurface irrigation.

These observations were compiled by:

Jeffrey W. Cox, Sr. **RPSS**
Certified/Registered Professional Soil Scientist
Microbiologist
TN Licensed Wastewater & Collection Operator #3487

5-25-2011

IRM – C&C *Company*

Soil Descriptions

Per Chapter 17

Wastewater Disposal By Subsurface Drip Irrigation

Arrington Vineyards & Russell/Brooks Property

Site: Drip Area **County:** Williamson **Date:** 5/19/2011

Conditions	Temp F	Humidity %	Comment
Partial Sun	65-80	70	Moist Soils

Pit # 1

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-4	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	4-7	7.5 YR 4/4	si l	2 f&m sbk	v fr	No	Abundant Roots
B 2	7-12	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots
B t1	12-20	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	20-29	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots
B t3	29+	5YR 5/6 7.5YR 6/8	c	2 m abk&sbk	v fr	No	50-50% Mottled

Pit # 2

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-8	7.5 YR 3/2	si l	3 f gr	v fr	No	-
B 1	8-10	7.5 YR 4/6	si l	2 m sbk	v fr	No	
B t1	10-22	5YR 5/8	si cl	2&3 m sbk	v fr	No	
B t2	22-29	5YR 5/6	c	2&3 m sbk	fr	No	
B w	29-35	7.5YR 5/6 7.5YR 6/2	c	1 m&c sbk	fi	Weak	60-40% Mottled Few Roots
R	35					No	

Pit # 3

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-9	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B t1	9-18	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	18-27	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots
B t3	27+	5YR 5/6 7.5YR 6/8	c	2 m abk&sbk	v fr	No	

Pit # 4

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-9	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	9-16	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots
B t1	16-27	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	27+	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots

Pit # 5

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-7	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	7-12	7.5 YR 4/4	si l	2 f&m sbk	v fr	No	Abundant Roots
B 2	12-19	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots
B t1	19-25	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	25+	5YR 5/6 7.5YR 6/8	c	2 m abk&sbk	v fr	No	Few Roots

Pit # 6

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-10	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	
B 1	10-22	7.5 YR 4/4	si l	2 f&m sbk	v fr	No	Abundant Roots
B 2	22-30+	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots

Pit # 7

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-9	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	9-18	7.5 YR 4/4	si l	2 f&m sbk	v fr	No	Abundant Roots
B 2	18-25	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots
B t1	25-38	5YR 5/6	sicl - c	2 m abk	fr	No	Many Roots

Pit # 8

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-8	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	8-12	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots
B t1	12-21	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	21-25	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots Manganese Stains
B t3	25-33+	7.5YR 5/8	c	M - 1m sbk	fr	No	Manganese Stains

Pit # 9

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-9	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	9-16	7.5 YR 4/4	si l	2 f&m sbk	v fr	No	Abundant Roots
B 2	16-30	5YR 5/6	sil - sicl	3 m sbk	v fr	No	Abundant Roots
B t1	30-40	5YR 5/6	sicl	2 m abk	fr	No	Many Roots

Pit # 10

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	1-9	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	9-21	7.5 YR 4/4	si l	2 f&m sbk	v fr	No	Abundant Roots
B 2	21-31	5YR 5/6	sil	3 m sbk	v fr	No	Abundant Roots
* B x	31	5YR 5/6	l	1 m sbk	v fr - brittle	* fragic properties	MN Concr & Stains

Pit # 11

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-10	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B t1	10-19	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	19-26	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots
B t3	26-42	5YR 5/6	sil - sicl	1 m sbk	pl	No	Plastic

Pit # 12

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-10	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B 1	10-18	5YR 5/6	si l	2 m sbk	v fr	No	
B t1	18-30	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	30-38	5YR 5/6 7.5YR 6/8	sicl	2 m sbk	fr	No	Manganese Stains

Pit # 13

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	0-6	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B t1	6-16	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	16-21	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots
B t3	21-37	5YR 5/6 7.5YR 6/8	c	1 m sbk	fi	No	

Pit # 14

Horizon	Depth	Color	Texture	Structure	Consistence	Red/Ox Mottles	Observations
	Inches	Moist			Moist	Presence	
A p	1-9	7.5 YR 3/2	si l	1 & 2 m gr	v fr	No	-
B t1	9-17	5YR 5/6	sicl	2 m abk	fr	No	Many Roots
B t2	17-28	5YR 5/6 7.5YR 6/8	c	2 & 3 m abk	fr	No	50-50% Mottled Few Roots
B t3	28-38	5YR 5/6	sil - sicl	1 m sbk	pl	No	Plastic
R	38						

Water Pollution Control Soil Map

Arrington Vineyards
&
Russell/Brooks Property
Williamson County

May 19, 2011

* *Soil Legend and Area Descriptions*

The initial descriptions of Areas 1 - 3 in "Blue" are previously mapped areas. Areas 4-9 is current mapping by Environmental Soil Consulting.

❶ **Region:** **Stiversville;**
60 mpi to 30" C.S. (Assumed Conventional System)
45 moi L.P.P (Assumed Low Pressure Pipe)
0-5% (Assumed Slope)

❷ **Region:** **Stiversville;**
75 mpi to 30" C.S. (Assumed Conventional System)
60 moi M.L.P.P (Assumed Modified Low Pressure Pipe)
1-5% (Assumed Slope)

❸ **Region:** **Nesbitt;**
74 mpi to 24" C.S. (Assumed Conventional System)
60 moi M.L.P.P (Assumed Modified Low Pressure Pipe)
0-5% (Assumed Slope)

❹ **Region:** **Stiversvile; 2-8 % Slopes**
This area had two pits excavated and described. Pit #'s 5 & 8. Pit #5 was dug in the low point of the swale. There was no presence of red-ox conditions in either pit. Acceptable structure and texture was noted to greater than 25 inches. This area is suited for subsurface drip irrigation based on WPC Tables.

❺ **Region:** **Inman; 2-8 % Slopes**
There were six pits dug in this area to determine the limits and depths of the rock encountered in borings. These pits are located on the WPC Soil Map (#'s 2, 3, 4, 6). Descriptions of the pits were at the edges of the rock ledges and still indicated acceptable soils. The ends of the rock ledges were shot in with survey equipment and plotted on the WPS Soil Map. The ledge depth was generally greater than 20 inches but had small inclusions of areas 12-18 inches in depth. This area will be omitted from use although it may be practical for use if needed.

❻ **Region:** **Stiversvile; 2-8 % Slopes**
This area had one pit excavated and described. Pit # 12. There was no presence of red-ox conditions in the pit. Acceptable structure and texture was noted to greater than 38 inches. This area is suited for subsurface drip irrigation based on WPC Tables.

❼ **Region:** **Stiversvile; 2-8 % Slopes**
This area had four pits excavated and described (Pit #'s 1, 11, 13, 14). There was no presence of red-ox conditions in the pits. Acceptable structure and texture was noted to greater than 29 inches. This area is suited for subsurface drip irrigation based on WPC Tables.

*The Areas that have the swale, cross the abandoned water line, cross the abandoned tight line, and cross the abandoned subsurface sewage disposal field are suitable for Drip Irrigation Disposal areas. The nature of Drip Irrigation Disposal does not promote issues with short circuiting as occurs with Subsurface Sewage Disposal Systems.

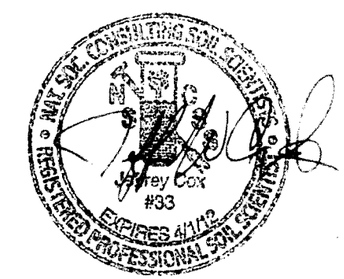
The soils in the previously mapped areas had three pits excavated and described. These are Pit #'s 7, 9, and 10. There was no presence of red-ox conditions in the pits. Acceptable structure and texture was noted to greater than 29 inches. These areas are suited for subsurface drip irrigation based on WPC Tables.

Notes

- Slopes are 2-15% unless otherwise noted.
- Any cutting, filling or compaction will **VOID** this soil map.
- This map is for the use with subsurface drip irrigation systems. It is not for review for subsurface sewage disposal systems nor is it to be used to quantitatively use a rating from the Appendix in the Regulations Governing Subsurface Sewage Disposal for design of drip disposal area. The rates assigned in the Appendix are only *empirical and qualitative.*
- The descriptions of the soils fit the descriptions and ranges of descriptions in the NRCS typifying pedon Series Descriptions..
- Permeability studies were **NOT** performed, therefore, it is anticipated that empirical values from design Guidelines will be used for design whether accurate or not.
- Control point locations and soil pit locations were supplied by SEC, Inc.
- Soil Pit Descriptions are also supplied.
- Previous Extra-high Intensity Soil Mapping by others of a partial area was included and indicated on the WPC Soil Map. This information was adjusted to a 1'=50' scale and traced on the WPC Soil Map with diligent care. The previous Soil Scientist has the right to comment on their mapping. A copy of this map is on page 3 of this report. This map is not to scale and can be supplied to scale if requested.
- This map is in color and a black and white copy may not indicate all lines and delineations and should be void.

Water Pollution Control Soil Map completed by:

Environmental
Soil Consulting
3444 Saint Andrews Drive
Baneberry, Tennessee 37890
Office (Vol) 674-6334
Facsimile 674-2352



Jeffrey W. Cox, Sr., **RPSS**
Tennessee Licensed Professional Soil Scientist #60
(Updated Review July 30, 2011)

I, Jeffrey W. Cox, Sr. affirm that this Water Pollution Control Soils Map has been prepared in accordance with acceptable standards and methodologies established in the NRCS Soil Survey Manual and USDA Soil Taxonomy. No other warranties are made or implied.

Water Pollution Control Soil Map

Arrington Vineyards
&
Russell/Brooks Property
Williamson County

May 19, 2011

0 50 100
feet

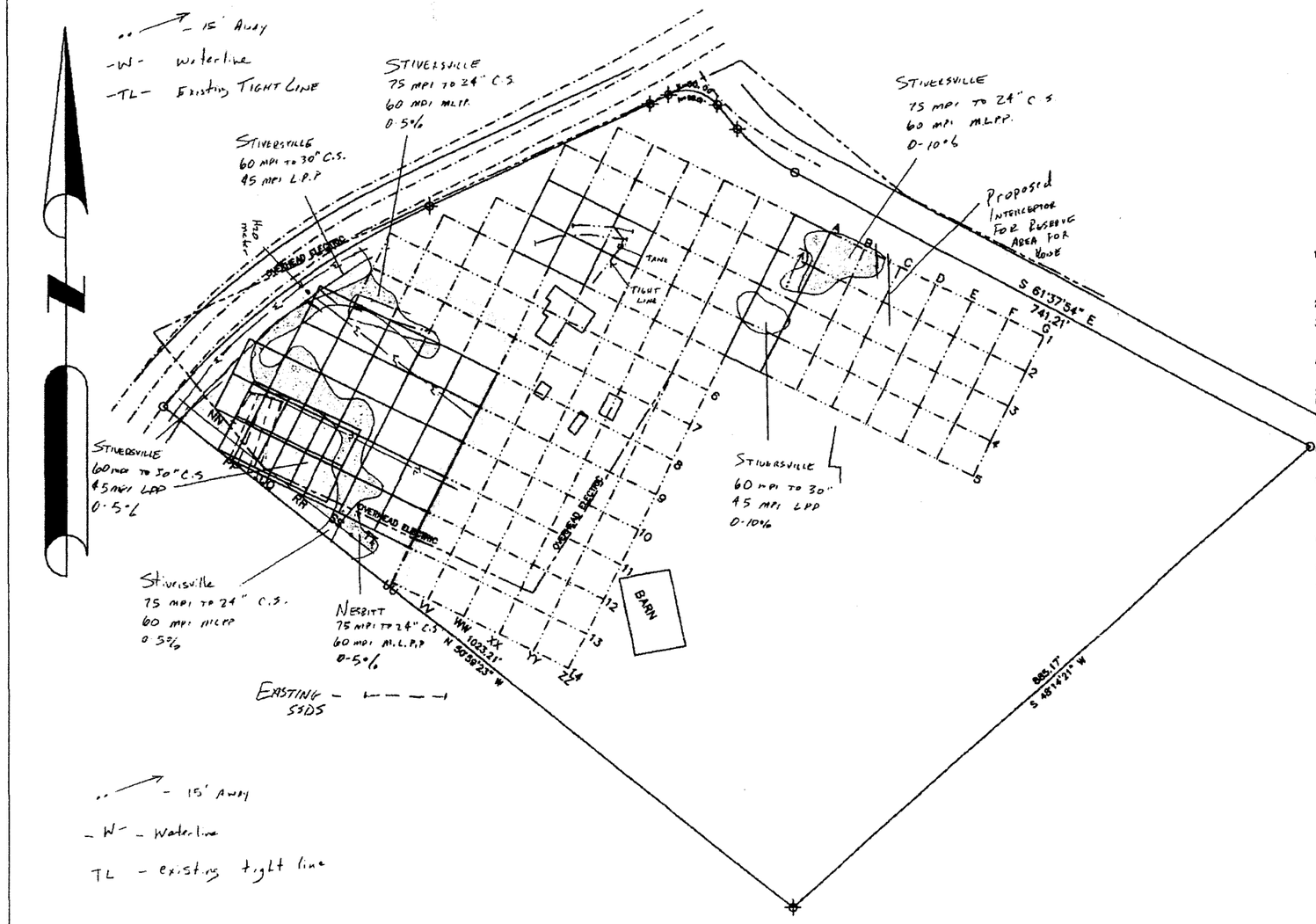
EXIST. HOUSE
BLDG. No. 1

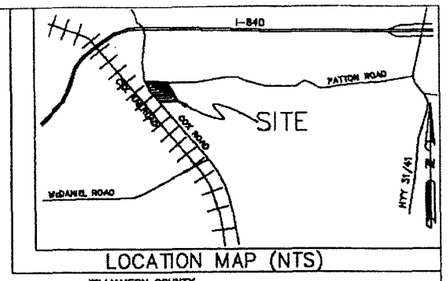
COX ROAD
PAVEMENT

DENSE TREES
TEST PIT FOR SOILS (TYP.)
EXIST. VINEYARD
DENSE TREES
TRENCH
TEST PIT FOR SOILS (TYP.)
UGE STUB
UGE
TEST PIT FOR SOILS (TYP.)
WOOD STAKE "SEPTIC TANK"
TL
OHE
SPIGOT
EXIST. HOUSE
CONC.
PVMT.
SHOP
SHED
SHED
GRAVEL
PVMT.
GRAVEL
24" RCP (SILTED) INV.=707.60
4' WOOD FENCE
SPIGOT
24" RCP INV.=708.28
GRAVEL
EXIST. BARN
SPIGOT
48"CMP INV.=684.20
PAVEMENT
48" CMP INV.=686.13
HW-24"CMP INV.=687.18
RIP-RAP

Symbol Legend

- Staked Control Grid
- Surveyor Located Soil Pit Location
- Insignificant Old Fence Row
- Previous Soil Mapping Lines in "Blue"
- Water Line
- Tight Line
- SSDS Line Area





LOCATION MAP (NTS)

WILLIAMSON COUNTY
DEPARTMENT OF SEWAGE DISPOSAL MANAGEMENT

1.) Any cutting, filling, compaction or disturbance from their natural state, of the soil areas reserved for sewage disposal, shall result in revocation of the lot approval. Additionally, the Department shall have the authority to refuse to grant a Construction Permit or may revoke a Construction Permit where the integrity of the proposed subsurface sewage disposal system areas has been compromised.
2.) All septic systems must be installed by an Installer licensed by Williamson County to construct alternative or conventional septic systems.
3.) No bathing fixtures exceeding standard capacity (30 US gallons), including, but not limited to, oversized bathtubs, spa-tubs, hot-tubs, whirlpools, or Jacuzzis, etc., shall be allowed unless specifically approved by the Department of Sewage Disposal Management.
4.) No utilities (i.e. gas, water, or electric) or their easements, above or below ground, shall be allowed to encroach within ten feet (10') of the boundaries of the soil areas reserved for sewage disposal.
5.) Curtain/interceptor/draw down drains may be required on any or all lots.
6.) No cutting, filling, compaction or any disturbance of the area reserved for sewage disposal shall be permitted.
7.) The limits of all excavations greater than 18 inches in depth, made for the purpose of house construction (or any other type construction), shall be kept 25 feet or more away from the platted or designated sewage disposal areas.
8.) The limits of all excavations, made for the purpose of house construction (or any other type of building construction), shall be kept within the confines of the platted building envelope.
9.) All parts of the house and any of its appendages (including, but not limited to: detached garages, porches, decks, sidewalks, driveways, parking areas, utilities, etc.) shall strictly adhere to the minimum setback requirements from the subsurface sewage disposal system areas as outlined in Section 13 of the Regulations Governing On-Site Sewage Disposal Systems of the Williamson County Department of Sewage Disposal Management adopted May 18, 2000 and effective October 1, 2000.
10.) No construction of patios, swimming pools, accessory buildings, etc. shall be allowed on any lot served by a subsurface sewage disposal system, unless approved by the Department of Sewage Disposal Management.
11.) Water service lines must be separated from sewage disposal areas or platted disposal field areas by a minimum of 10 feet.
12.) No water source, wells or springs are to be drilled or constructed within 50 feet of any portion or component of the septic system or the designated or platted sewage disposal field area.
13.) This lot is restricted to one, 4 bedroom, single-family dwelling, with no oversized bathing fixtures, unless otherwise noted.
14.) All platted sewage disposal areas shall be field-staked by a licensed surveyor and fenced off, to protect the area from all construction traffic, by the property owner or building contractor. The areas then shall be checked and verified by the Department of Sewage Disposal Management prior to the issuance of the septic permit.
15.) The type of septic system necessary to serve this lot/tract will be determined at the time an application for a septic permit is made at the Department of Sewage Disposal Management.
16.) This site may mandate the use of a sewage/effluent pump and appropriately sized pump tank in order to provide sewer services from the house to the SSDS areas. This shall be specified by the Williamson County Department of Sewage Disposal Management based upon the finished elevation of the house plumbing stub-out and the SSDS area.
17.) No irrigation systems, or their components thereof, shall encroach on, in or within 10 feet of the boundaries of the designated or platted SSDS areas. It shall also be located a minimum of 5 feet away from any drainage improvement practice associated with the SSDS area.
18.) The lots shown herein as lot/tract B, Sanford Property, are not considered being approved by the Williamson County Department of Sewage Disposal Management.
19.) Where any plat is required to have Department approval, as outlined in these regulations or the regulations of any government entity (i.e. Williamson County Planning Commission, Incorporated town or city within the boundaries of Williamson County, etc.), the following signature block shall be placed upon said plat(s).
20.) Prior to installation, the location of the well, spring, cistern or private water source must be approved by the Department of Williamson County Sewage Disposal Management.
21.) Location of wells, springs, cisterns, or private water source must be a minimum of fifty, (50) feet away from any sewage disposal area, including those located upon adjoining lots.
22.) Exact location of the water source (ie. wells, cisterns, springs or private water source) must be field located by a surveyor or engineer on a copy of this plat and submitted to the Department of Williamson County Sewage Disposal Management for review and record keeping purposes.
23.) Designated sewage disposal areas platted in accordance with acceptable percolation test areas field mapped by _____ private consulting soil scientist, on Date: _____

Certification of General Approval for Installation of Subsurface Sewage Disposal Systems with Restrictions

General approval is hereby granted for lots proposed hereon as being suitable for subsurface sewage disposal with the listed and/or attached restrictions.

Before the initiation of construction, the location of the house or other structure and plans for subsurface sewage disposal system shall be approved by the local Health authority.

Date _____ Local Health Authority

Copy of Previous Soil Mapping

Arrington Vineyards & Russell/Brooks Property
Williamson County

"NTS"

Page 3 of 3

0' 100' 200' 300'

SCALE: 1"=100'

ARRINGTON VINYARDS SOIL MAP		
DRAWN	DATE 02/28/11	
APPROVED	DATE	
SCALE 1" = 100'	SHEET	PROJECT NO.

GALYON W. NORTHCUTT
2807 FOREST VIEW DRIVE
ANTIOCH, TN 37013
TN RLS #1529

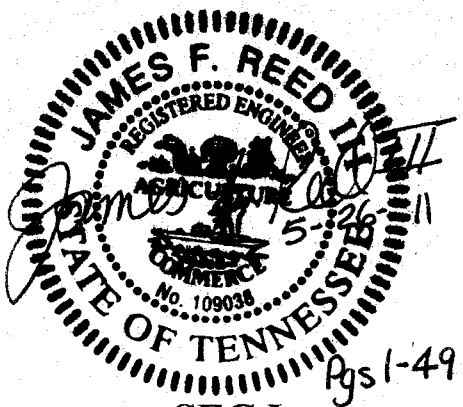
I HEREBY CERTIFY THAT THIS IS A CATEGORY 1 SURVEY AND THAT THE RATIO OF PRECISION OF THE UNADJUSTED SURVEY EXCEEDS 1:10,000 AS SHOWN HEREON. I CERTIFY THAT THE GRIDED AREA HAS BEEN STAKED WITH AN ACCURACY EXCEEDING 1':1,000 AS SHOWN HEREON.

Preliminary Engineering Report
&
Design Specifications

Arrington Vineyard & Russell/Brooks Property
Williamson County, Tennessee

An Addition to Integrated Resource Management, Inc.
(IRM Utility, Inc.)

Advanced Wastewater Treatment System
&
Slow Rate Land Treatment Disposal by Drip Irrigation

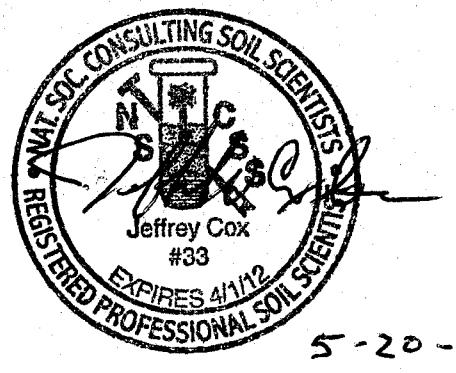


5-26-11

Pgs 1-49

SEC Inc.
850 Middle Tennessee Boulevard
Murfreesboro, Tennessee 37129

Prepared by:



5-20-2011

Environmental Soil Consulting
3444 Saint Andrews Drive
White Pine, Tennessee 37890

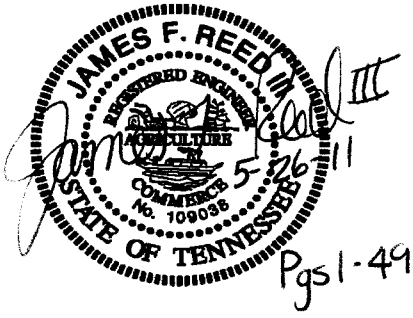
Preliminary Engineering Report
&
Design Calculations

Arrington Vineyards LLC
6211 Patton Road
Arrington, Tennessee

An Addition to Integrated Resource Management, Inc.
(IRM Utility, Inc.)

Advanced Wastewater Treatment System
&
Slow Rate Land Treatment Disposal by Drip Irrigation

SEC, Inc.
SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
850 MIDDLE TENNESSEE BLVD • MURFREESBORO, TENNESSEE 37129
PHONE (615) 890-7901
WWW.SEC-CIVIL.COM



Pgs 1-49

Index

1. Preliminary Engineering Report

Description of Wastewater Generating Facility:

The effluent is collected at five locations at Arrington Vineyards. The proposed low pressure pipe system design would utilize septic tanks and pump tanks from the proposed retreat building (existing barn bldg 3) and the existing buildings that pumps domestic waste to an approved soil area (as shown on Wastewater Treatment System) At this point, the soil continues to provide additional treatment.

System Design Flow:

1. Existing House Building 1 = 300 GPD assumed
2. Existing House Building 2 = 300 GPD assumed
3. Proposed Retreat (ex. Barn) Building 3 = (300 guest @ 5gpd/guest) =1,500 / 7days = 214gpd
4. Arrington Vineyards Building 4 = 3,896 GPD (Theoretical High BOD Process Waste)
   A. Domestic Waste Building 4 = 640 GPD
   B. Additional bathrooms Building 4 = 250 GPD
5. Existing Cabin Building 5 = 250 GPD
6. Process Waste (Existing Williamson Co. Permit) = 1,250 GPD

Total Domestic Waste = 1,954 GPD
Total Process Waste = 1,250 GPD
Total True Flow = (Domestic + Process) = 3,204 GPD

Total Design Flow = 7,100 GPD

Excess Design over Design for High BOD = 3,896 GPD

Collection System:

STEP effluent sewer forcemains will collect and distribute sanitary sewer effluent from buildings 1-5. The buildings will utilize water tight 2-compartment tanks for septic to provide primary treatment. After the septic tank the effluent enters a timed dosing tank with a control panel to manage peak flows. The pump vaults will also filter out solids prior to the collection lines. Once the effluent is pumped from each of the buildings 1-5, it is collected in a series of small diameter collection/forcemain lines that distribute the effluent to the recirculating tank for additional treatment.

Treatment System:

1. Existing House Building 1 = 300 GPD assumed
   Replace existing septic tank with 1,000 gal tank
   Install a 1000 gal pump tank

2. Existing House Building 2 = 300 GPD assumed
   Utilize Existing Septic Tank
   Utilize Existing Dosing Tank

3. Proposed Retreat (ex. Barn) Building 3 = (300 guest @ 5gpd/guest) = 1,500Gallons / 7 day dosing = 214 GPD

   For Septic Tanks Greater than 1500 GPD the minimum effective tank liquid capacity shall equal =

   Volume=1125+0.75(Q) = 1125+0.75(1500gpd) = 2,250 gal tank

4. Arrington Vineyards Building 4 = 4,786 GPD

   Existing 3,750 gal Pump Tank
   Existing 1,500 gal domestic septic tank
   Install 5,000 gal recirculating tank
   Install 5,000 gal treatment tank
   Install 3,000 gal dosing tank

5. Existing Cabin Building 5 = 250 GPD

   Install 1,000 gal septic tank
   Install 1,000 gal pump tank

Quanics ATS-16-AC/BC recirculating fixed film filter system will be the treatment. Effluent from the collection system will enter a 5,000 gallon recirculating tank. Effluent travels through the 5,000 gal ATS Module and is collected back to the recirculating tank. From the gravity recirculating device, 80% will return to the recirculating tank and 20% will flow to the 3,000 gal dosing tank. From the dosing tank, the effluent will flow through disc filters, ultraviolet disinfection, and ultimately to the drip dispersal field for final treatment. Final disposal will be through 5 drip zones with a total drip area of approximately 0.66 acres for the primary and 0.66 acres for

the secondary drip fields. The approximate drip dispersal rate will be 0.25 gal/day/sf for the Slow Rate Land Treatment. Geoflow or equivalent pressure compensating drip emitter lines will be utilized with spacing of 24" placed on 5' centers between the existing vineyards.

Disposal Field Area:

Design Flow = 7,200 gpd

Primary Drip Disposal Area 7,100gpd / 0.25gal/sf = **28,400 sf** = **0.65 acres**
Secondary Drip Disposal Area = **28,400 sf** = **0.65 acres**

Treatment Alternatives:

1. Connection to existing municipal/public sewer:

   In evaluating this property, we first looked at the possibility for connection to a municipal/public sewer system. The nearest municipality to this property is the City of Franklin. It is located nearly 6.5 miles from the city limits of Franklin. The nearest public sewer main is also in excess of 6.5 miles to the northwest of the site. Construction cost along with easements would be financially impractical for a site this size.

2. Use of on-site disposal as Regulated by Tennessee Department of Environment and Conservation (TDEC) Division of Water Pollution Control (WPC)

   WPC Mapping and soil pit descriptions have indicated several areas that are suitable for drip dispersal. Included in the report from Environmental Soil Consulting of White Pine, Tennessee is a summary of the soil conditions.

The motivation of Integrated Resource Management, Inc (IRM Utility Inc.) of White Pine, Tennessee to accept the Arrington Vineyard Development and System into their service area has made the use of a STEP system with recirculating filter system with drip dispersal a feasible option. The monthly fees proposed by Tennessee Regulatory Authority in a special Rate Contract for low volume uses make this a viable project.

2. Calculations

1. Existing House Building 1 = 300 GPD assumed

2. Existing House Building 2 = 300 GPD assumed

3. Proposed Retreat (ex. Barn) Building 3 = (300 guest @ 5gpd/guest) =1,500 / 7days = 214gpd

4. Arrington Vineyards Building 4 = 3,896 GPD (Theoretical High BOD Process Waste)
   A. Domestic Waste Building 4 = 640 GPD
   B. Additional bathrooms Building 4 = 250 GPD

5. Existing Cabin Building 5 = 250 GPD

6. Process Waste (Existing Williamson Co. Permit) = 1,250 GPD

   Total Domestic Waste = 1,954 GPD
   Total Process Waste = 1,250 GPD
   Total True Flow = (Domestic + Process) = 3,204 GPD

   Total Design Flow = 7,100 GPD

   Excess Design over Design for High BOD = 3,896 GPD

3. Design Specifications

ARRINGTON VINEYARDS

-DESIGN SPECIFICATIONS-

TREATMENT SYSTEM

- Quanics scat recirculating treatment system
- ATS-16 AC/BC module producing recirc-blend effluent
- Number of modules based on the following:

Peak flow per module	5,000 GPD
Total Domestic Waste	1,954 GPD
Total Process Waste	1,250 GPD
Total True Flow = (Domestic + Process)	3,204 GPD
Total Design Flow	7,100 GPD
Excess Design over Design for High BOD	3,896 GPD

Number of modules needed:

7,100 GPD / 8750 GPD = .8 Modules

1 ATS-5000 Module & 3,750 GPD existing tank will service 7,100 gallons

- The ATS treatment system is to be installed by an authorized Quanics installer. The system is to be installed to the most current construction and installation methods at time of installation.

RECIRCULATING TANK

- 5,000 Gallon recirculating tank manufactured by Barger and Sons of Harriman, Tennessee.
- See attached installation guidelines and design specifications
- Recirculating tank shall contain 2 separate Quanics PTE-30 plus pumps (or equivalent) w/filtered pump vault
- Recirculating tank shall contain Quanics gravity recirculating devise w/ 100/80/20 split

- Risers – Risers shall be Quanics with a 26" diameter. Riser is to extend beyond ground with the following:

    - Rubber grommets. One for each splice box and pump discharge and shall be installed as per manufacturer's specifications.
    - Risers shall be poured in place with cast-in-place tank adapters.
    - One lid shall be furnished with each riser. Lids should be supplied with gasket, stainless steel safety screws and screw fitting.

DRIP FIELD DOSING TANK

- 3,000 gallon pump dosing tank manufactured and supplied by C.R. Barger & Sons, Inc. (or equivalent). Plans have dosing tank installation specifications
- Dosing tank to contain 1 set of Quanics duplex pumps (or equivalent) (STEP30-05121) w/filtered pump vault
- Duplex pumps are to supply 12 total doses to 1 one for 23.35 minutes (296 gallons per dose) each dose with a flow rate of 12.54 GPM. Total flow to drip field to be approximately 7,100 gallons per day
- Risers – Risers shall be Quanics with a 26" diameter. Riser is to extend beyond ground with the following:

    - Rubber grommets. One for each spice box and pump discharge and shall be installed as per manufacturer's specifications.
    - Risers shall be pored in place with cast-in-place tank adapters.
    - One lid shall be furnished with each riser. Lids should be supplied with gasket, stainless steel safety screws and screw fitting.

PUMPING ASSEMBLIES

- All pumping systems shall be Quanics Systems high-head pumping assembly or engineer approved equal and shall be composed of:

- The screened pump vault filter shall be a Quanics filtered pump vault (or equivalent).

- Discharge hose and valve assembly shall be Quanics model PDS-TD-1.50-H (or equivalent), 1.50" diameter, 150 psi pvc ball valve and check valve, pvc flex hose with working pressure rating of 100 psi, schedule 40 pvc pipe and a 12" length of pvc flex hose with fittings to be installed outside the riser.

- Mercury switch float assembly shall be Quanics model ac-mfs (or equivalent), with four mercury switch floats mounted on a pvc stem attached to the effluent screen. The floats must be adjustable without removing screened pump vault. The high/low alarm functions shall be preset as shown on the drawing. Each mercury switch float shall be secured with a nylon strain relief bushing. The "A" floats shall be UL or CSA-listed and shall be rated for 4.5a @ 120v.

- High-head effluent pump shall be models specified above with a 20 foot long extra heavy duty (so) electrical cord with ground to motor plug. Pump shall be UL and/or CSA listed as an effluent pump. Pump shall be provided with a none-prorated two (2) year warranty.

- Electrical splice box shall be Quanics model ac-jsb-5 (or equivalent), UL approved for wet locations, equipped with electrical cord grips and a 3/4-inch outlet fitting. Also included shall be us listed butt splice connectors.

- Controls and alarms shall be custom Quanics model ac-cp-d-g-t (or equivalent)
  - Panels shall be field repairable without use of soldering irons or substantial disassembly. Control panels shall meet the following at a minimum:
  - Audible alarm: Panel mount with a minimum of 80 db sound pressure at 24 inches as a warble tone.
  - Visual alarm: Nema 4, 7/8-inch diameter, oil-tight with push-to silence feature.
  - Audio-alarm reset relay: 115v, automatic, with din rail mount socket base.
  - Toggle switch: 15 amp motor rated, single-pole. Double-throw with three positions: manual (man), (off), and automatic (auto) (per pump).
  - Circuit breaker disconnect: Rated for 20 amps. Off/on switch. Din rail mounting with thermal magnetic tripping characteristics.
  - Enclosure: Nema 4x, stainless steel or non-metallic hinges, stainless steel screws and pad lockable latch.
  - Alarm circuit: Wired separately from the pump circuit so that, if the pump internal overload switch or current-limiting circuit breaker is tripped, the alarm system remains functional.
  - Motor start contractor: Rated for 24 fla, single-phase. 60 hz.
  - Elapsed time meters.
  - Siemens logo plc controller.
  - Pump run lights (per pump).

- Sequence of operation shall be as follows:

  There is an mf4a float tree assembly, operating as follows (from the bottom going up):

FS 1 low level off
FS 2 timer enable
FS 3 pump timer override
FS 4 high water alarm

- The panel is to control and operate the two pumps in the following manner:

  The pumps are to operate in the following sequence after FS 2 initiates the programmable pump on/off timer:

  P1 on for designated duration
  Pumps off for designated duration
  P2 on for designated duration
  Pumps off for designated duration
  P1 on for designated duration
  Pumps off for designated duration
  P2 on for designated duration
  Pumps off for designated duration
  Cycle repeats as long as timer float is engaged

  If FS 3 "makes" then the following is to happen:

  If P1 is running then P2 is to come on in parallel and vice versa
  If P2 is running then P1 is to come on in parallel and vice versa

  If FS 4 "makes" then the light/horn should flash/sound and all pumps shall en energized. Upon the de-energizing of FS 3 normal operation shall resume.

- Installation

  All pumping systems shall be installed in accordance with the manufacturer's recommendations and the standard plans.

- Location

  Control panel is to be field located at the time of installation.

GRD – Gravity Recirculation Device

- Furnish and install one (1) Quanics model ast-grd-100/80/20 gravity recirculating valve (or equivalent).

4. Technical Sheets

Wastewater Treatment System Service Area
Arrington Vineyards
Williamson County, TN
N.T.S.

SEC, Inc.
SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
850 MIDDLE TENNESSEE BLVD • MURFREESBORO, TENNESSEE 37129
PHONE (615) 890-7901 • FAX (615) 895-2567

1. ANY CHANGE TO THE DESIGN SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER OF THIS WASTEWATER SYSTEM, SO THAT THE IMPACT ON THE SYSTEM CAN BE DETERMINED. IF ANY REDESIGN OF THIS WASTEWATER SYSTEM IS NECESSARY, THE ADDITIONAL COST OF THE ENGINEERING SHALL BE THE SOLE RESPONSIBILITY OF THE OWNER.

2. THIS IS NOT A BOUNDARY SURVEY AND SHOULD BE USED FOR VIEWING THE WASTEWATER SYSTEM SERVICE AREA ONLY. BOUNDARY LINES ARE TAKEN FROM EXISTING PLATS AND DEEDS.

3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.

4. THE CONTRACTOR SHALL BE SOLEY RESPONSIBLE FOR ALL MEANS, METHODS AND SEQUENCES OF CONSTRUCTION. HE SHALL HOLD THE ENGINEER AND THE OWNERS HARMLESS FROM ANY FINE, PENALTY OR JUDGEMENT ARISING THEREOF.

5. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE OWNERS SO THAT THERE IS MINIMAL INTERFERENCE WITH NORMAL OPERATIONS.

6. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES DURING ALL PHASES OF THE CONSTRUCTION PROCESS. NO PUBLIC OR PRIVATE STREETS OR DRIVES SHALL BE BLOCKED.

7. THE CONTRACTOR SHALL MAINTAIN AN ACCURATE RECORD ON A DESIGNATED SET OF PLANS OF ALL WORK CONSTRUCTED. ALL NEW WORK SHALL BE FULLY DIMENSIONED. THE LOCATION, DEPTH AND DIRECTION OF SERVICE CONNECTIONS SHALL BE SHOWN. THE LOCATION OF ALL MANHOLES, VALVES, BOOSTER STATIONS AND TANKS SHALL ALSO BE SHOWN. THIS SET OF PLANS IS TO BE TURNED OVER TO THE ENGINEER UPON COMPLETION OF PROJECT.

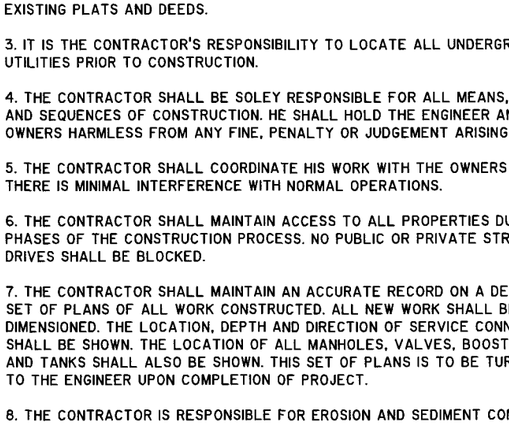
8. THE CONTRACTOR IS RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL. DEVICES SHALL BE PUT IN PLACE TO PREVENT SEDIMENTS FROM REACHING ANY DRAINAGE APPURTENANCES OR ADJACENT PROPERTIES. IF THIS REQUIREMENT IS NOT COMPLIED WITH, THE CONTRACT WILL BE IN DEFAULT AND ANY INCURRED PENALTIES OR JUDGEMENTS WILL BE THE CONTRACTOR'S RESPONSIBILITY.

9. THE CONTRACTOR SHALL BE SOLEY RESPONSIBLE FOR SITE SAFETY AND JOB SAFETY. HE SHALL HOLD BOTH THE OWNER AND THE ENGINEER HARMLESS FROM ANY FINE, PENALTY OR JUDGEMENT ARISING THEREOF.

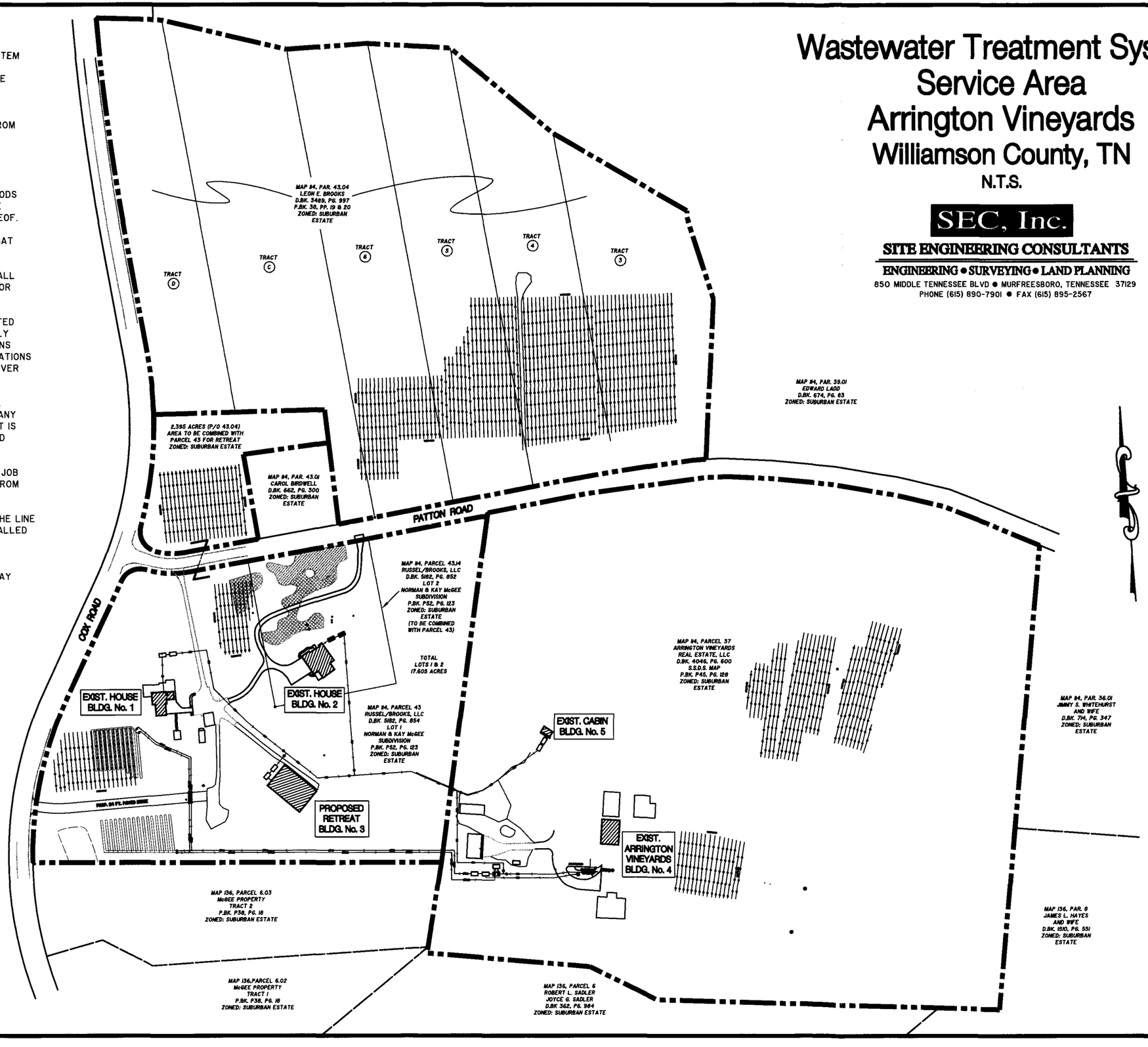
10. ALL SEWER PIPING TO BE INSTALLED WITH LOCATOR TAPE IDENTIFYING THE LINE AS SEWER LINE. SOLID 12 GA. COPPER COATED TRACER WIRE SHALL BE INSTALLED ON ALL PIPING.

11. LOCATION OF DRIP FIELD, UNDERGROUND TANKS, PIPES, BUILDINGS, ETC. ASSOCIATED WITH THE WASTEWATER SYSTEM IS APPROXIMATE. LOCATION MAY CHANGE DUE TO SITE CONDITIONS, ETC.

12. THE CONTRACTOR SHALL RESTORE ALL AREAS DAMAGED BY THE CONSTRUCTION PROCESS TO AS NEAR ORIGINAL CONDITION AS POSSIBLE.

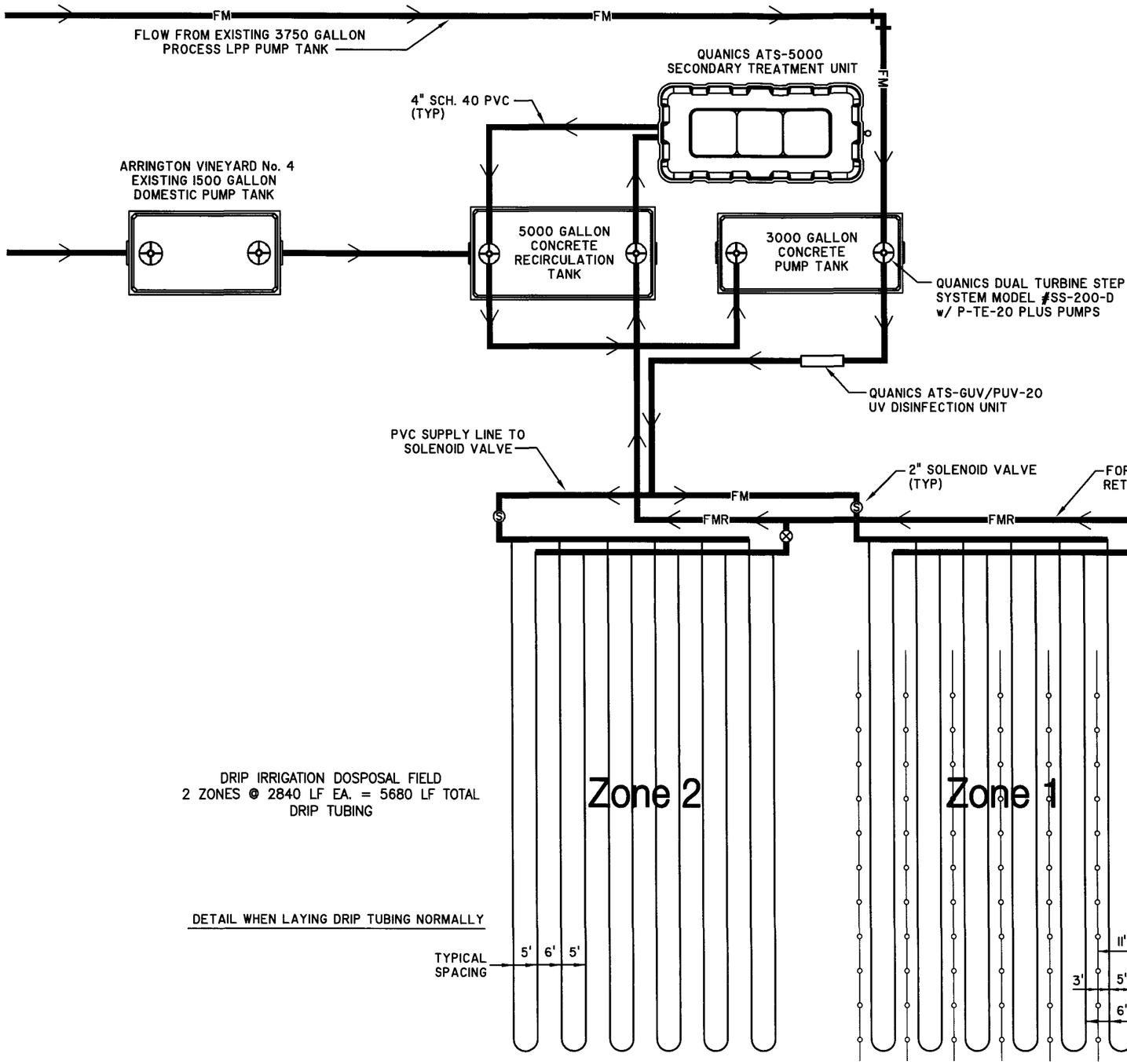


Vicinity Map
n.t.s.



Wastewater Treatment System Component Schematic Detail
Arrington Vineyards
Williamson County, TN
N.T.S.

SEC, Inc.
SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
850 MIDDLE TENNESSEE BLVD • MURFREESBORO, TENNESSEE 37129
PHONE (615) 890-7901 • FAX (615) 895-2567



Wastewater Treatment System
Site Plan
Arrington Vineyards
Williamson County, TN
N.T.S.

SEC, Inc.
SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
650 MIDDLE TENNESSEE BLVD • MURFREESBORO, TENNESSEE 37129
PHONE (615) 890-7901 • FAX (615) 895-2567

LEGEND

S	SEPTIC TANK
D	DOSING TANK
R	RECIRCULATING TANK (5000 GAL)
T	TREATMENT TANK (5000 GAL)
UV	ULTRAVIOLET DISINFECTION
FM →	FORCE MAIN
FMR ←	FORCE MAIN RETURN (FLUSH LINE)

MAP 114, PARCEL 43.01
CAROL BIRDWELL
D.BK. 662, PG. 300
ZONED: SUBURBAN ESTATE

AREA TO BE COMBINED WITH PARCEL 43
ZONED: SUBURBAN ESTATE

MAP 114, PARCEL 43.14
RUSSEL/BROOKS, LLC
D.BK. 5182, PG. 852
LOT 2
NORMAN & KAY McGEE SUBDIVISION
P.BK. P52, PG. 123
ZONED: SUBURBAN ESTATE

MAP 114, PARCEL 43
RUSSEL/BROOKS, LLC
D.BK. 5182, PG. 854
LOT 1
NORMAN & KAY McGEE SUBDIVISION
P.BK. P52, PG. 123
ZONED: SUBURBAN ESTATE

MAP 114, PARCEL 37
ARRINGTON VINEYARDS REAL ESTATE, LLC
D.BK. 4046, PG. 600
S.S.D.S. MAP
P.BK. P45, PG. 128
ZONED: SUBURBAN ESTATE

MAP 136, PARCEL 6.03
McGEE PROPERTY
TRACT 2
P.BK. P38, PG. 18
ZONED: SUBURBAN ESTATE

COX ROAD
PATTON ROAD
PAVEMENT
CONCRETE DRIVE
DIRT TRAIL
GRAVEL
PROP. 24 FT. PAVED DRIVE
VINEYARD
DENSE TREES
EXIST. HOUSE BLDG. No. 1
EXIST. HOUSE BLDG. No. 2
PROPOSED RETREAT BLDG. No. 3
EXIST. CABIN BLDG. No. 5
EXIST. ARRINGTON VINEYARDS BLDG. No. 4
EXISTING STORAGE POND
EXISTING DETENTION POND
EXISTING DRAIN FIELD LINES
EXIST. BARN
SHOP
SHED
CONC.
PVMT.
SEPTIC TANK
SEPTIC SYSTEM MANHOLES
EXIST. HOUSE
CLEAN OUT W/ ORANGE FLAG
2"PVC PIPE W/ ORANGE FLAG
4"PVC PIPE W/ ORANGE FLAG
SPIGOT
90° BEND
45° BEND
2-90° BENDS
2-45° BENDS
2-90° TEES
2-CHECK VALVES I-90° TEE
2"PVC STUB
24" RCP (SLTED) INV.=707.60
24" RCP INV.=708.28
4" WOOD FENCE
2-30 LF SCH. 80 4" PVC ENCASEMENT
TEST PIT FOR SOILS (TYP.)
NO DRIP LINES THIS AREA
WOOD STAKE "SEPTIC TANK"
CAUTION! RELOCATE UG TELEPHONE LINES AS NEEDED
UST
UGE
UGE STUB
ONE
FM
FMR
2"FM
2"FMR
50' MIN.
25' MIN.
FORCEMAIN TO DRIPFIELDS
DRIPFIELD FLUSH RETURN LINE
48"CMP INV.=686.13
HW-24"CMP INV.=687.18
RIP-RAP
3000 GAL. DOSING TANK
EXIST. 1500 GAL. DOMESTIC PUMP TANK
EXIST. 3750 GAL. PROCESS LPP PUMP TANK
SCI-24"HDPE TC=769.42
24"HDPE w/HW INV.=765.81
EXISTING STORAGE BLDG. FFE=778.02
SIDEWALK
CURB
LANDSCAPING
ZONE 1
ZONE 2

Wastewater Treatment System
Drip Irrigation Area
With Topography
Arrington Vineyards
Williamson County, TN
N.T.S.

SEC, Inc.
SITE ENGINEERING CONSULTANTS
ENGINEERING • SURVEYING • LAND PLANNING
850 MIDDLE TENNESSEE BLVD • MURFREESBORO, TENNESSEE 37129
PHONE (615) 890-7901 • FAX (615) 895-2567

EXIST. HOUSE BLDG. No. 1

CAUTION! RELOCATE UG TELEPHONE LINES AS NEEDED

EXIST. HOUSE

CONC.

PVMT.

45° BEND

OHE

710

705

700

695

690

SHOP

SHED

SHED

GRAVEL

DENSE TREES

UGT

TEST PIT FOR SOILS (TYP.)

2-90° BENDS

50' MIN.

ZONE 1

2"FM

2"FMR

2-45° BENDS

SEE SCHEMATIC SHEET FOR LAYOUT OF DRIP TUBING IN VINEYARD AREA.

24" RCP (SILTED) INV.=707.60

24" RCP INV.=708.28

2-30 LF SCH. 80 4" PVC ENCASEMENT

SPIGOT

VINEYARD

NO DRIP LINES THIS AREA

WOOD STAKE "SEPTIC TANK"

PROP. 24 FT. PAVED DRIVE

25' MIN.

UGE STUB

ZONE 2

EXISTING DRAIN FIELD LINES

TEST PIT FOR SOILS (TYP.)

2-90° TEES

FORCEMAIN TO DRIPFIELDS

DRIPFIELD FLUSH RETURN LINE

PROPOSED RETREAT BLDG. No. 3

2"PVC STUB

FM

45° BEND

S

D

EXIST. BARN

SPIGOT

GRAVEL

720

715

725

COX ROAD

PAVEMENT

48"CMP INV.=686.13

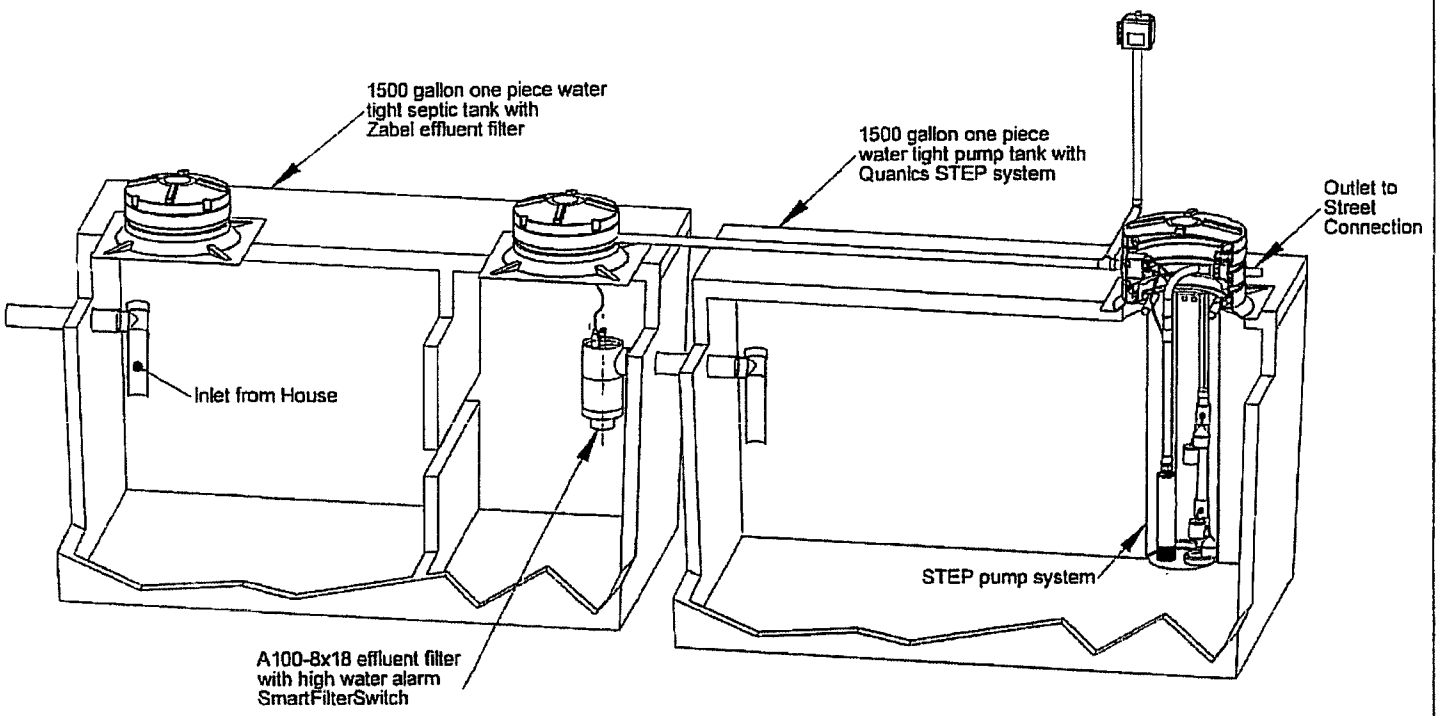
HW-24"CMP INV.=687.18

RIP-RAP

MAP 136, PARCEL 6.03
McGEE PROPERTY
TRACT 2
P.BK. P38, PG. 18
ZONED: SUBURBAN ESTATE

5. Tank Specifications

1500 gallon STEP system for 4 bedrooms or more



	NAME	DATE
DRAWN	TNJ	03-24-05
CHECKED	BB	03-24-05
UPDATED		

SCALE 1:30

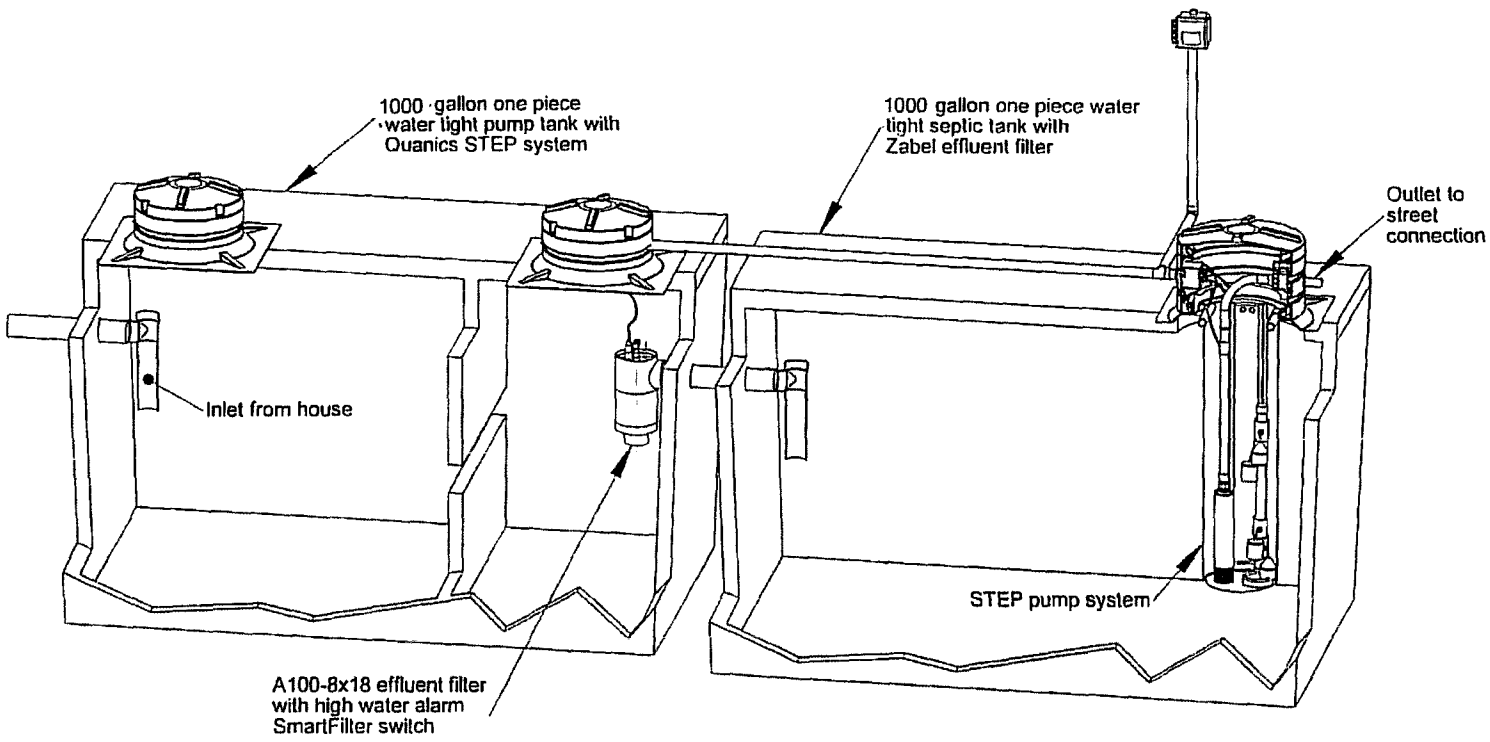
For questions and concerns please contact:
Aquatics Resources, Inc.
P.O. Box 645
White Pine, Tennessee 37890
(865) 674-0838

Quanics
P.O. Box 1520, Crestwood KY. 40014
www.quanics.net

SIZE	DESCRIPTION	REV.
A	1000 gal. STEP System 3 bedrooms or less	

SHEET 1 OF 1

1000 gallon STEP system for 3 bedrooms



	NAME	DATE
DRAWN	[illegible]	03-24-06
CHECKED	BB	03-24-06
UPDATED		

SCALE 1 : 30

For questions and concerns please contact
Aquatics Resources, Inc.
P.O. Box 645
White Pine, Tennessee 37890
(865) 674-0838

Quanics
P.O. Box 1520, Crestwood KY. 40014
www.quanics.net

SIZE A | DESCRIPTION: 1500 gal. STEP system 4 bedrooms or more | REV

SHEET 1 OF 1

Septic Tank Detail

Full line of septic tank accessories and pipe available.

INFILTRATOR SYSTEMS INC

ADS

EZflow

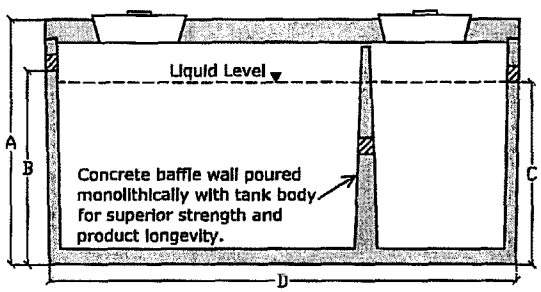
NPCA CERTIFIED PLANT

Dimension Legend

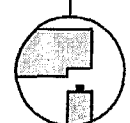
A - Tank height
B - Bottom of tank to inlet invert
C - Bottom of tank to outlet invert
D - Tank length

Finished Grade

Lids can be removed to access tank tee.



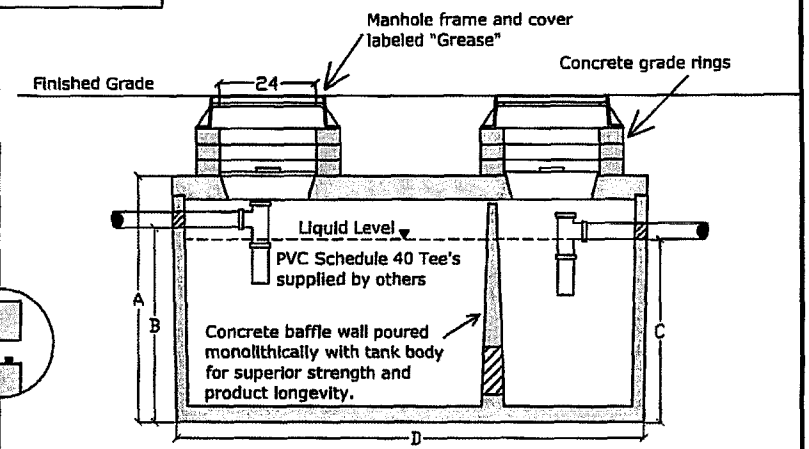
ASTM C-923 compliant pipe boot for inlet and outlet



Butyl Sealant: ASTM-C-990 Compliant

Tank Volume (gal.)	A (in.)	B (in.)	C (in.)	D (in.)	Width (in.)
750 Residential	53.25	42.75	40.25	107	56
900 Super Lowboy	47	37.5	35.5	126	66
1000 Lowboy	50	41	38	126	66
1000 (2-piece mid-seam)	63	52.25	50	107	56
1000 (1-peice top seam)	60	49	46	120	60
1000 H-20 Traffic Rated	58	45	42	132	72
1250	53	42.5	40.5	142	70
1500	60	49	46	142	70
1500 Super Lowboy	47	36.5	35	180	78
2100	67	51	49	180	78
1500 H-20 Traffic Rated	77.5	62	59	132	72
2000 H-20 Traffic Rated	95.75	79	76	132	72
2500	72	59	56	180	78
2500 H-20 Traffic Rated	101.5	87.5	84.5	132	72
3000	82	69	67	180	78
3500	91	78	76	180	78
4000	101	88	86	180	78
4500	111	98	96	180	78
5000	122	107	105	180	78

Grease Trap Detail



Tank Volume (gal.)	A (in.)	B (in.)	C (in.)	D (in.)	Width (in.)
900 Lowboy (Special Request)	48	36	34	126	66
1000 Lowboy (Special Request)	51	39	37	126	66
1000	62	49	46	120	60
1000 H-20 Traffic Rated	58	45	42	132	72
1250	55	42.5	40.5	142	70
1500	63	49	46	142	70
1500 H-20 Traffic Rated	77.5	62	59	132	72
2000 H-20 Traffic Rated	95.75	79	76	132	72
2100	67	51	49	180	78
2500	72	59	56	180	78
2500 H-20 Traffic Rated	101.5	87.5	84.5	132	72
3000	82	69	67	180	78
3500	91	78	76	180	78
4000	101	88	86	180	78
4500	111	98	96	180	78
5000	122	107	105	180	78

Manufactured by:
C.R. Barger & Sons, Inc.
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 **Fax** 865.882.6394
www.BargerAndSons.com

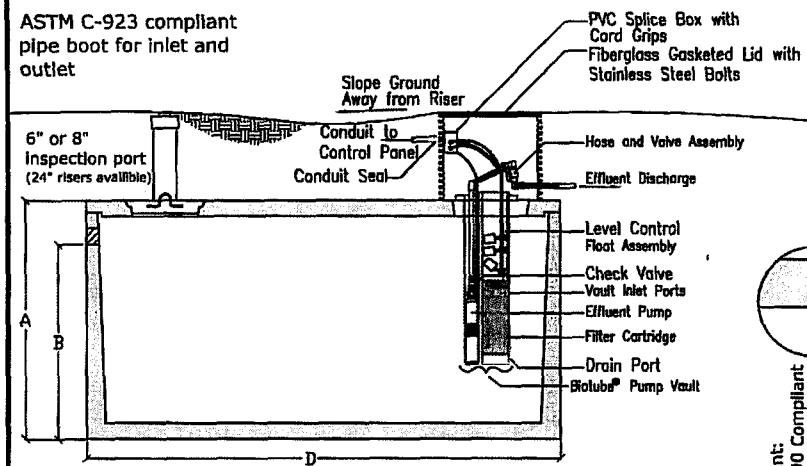
General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

Tank Type: General Detail
Date: 4.282008
Drawn By: Eric Barger
Approx. Weight:

Pump Tank Detail

Dimension Legend
A - Tank height
B - Bottom of tank to inlet invert
D - Tank length

ASTM C-923 compliant pipe boot for inlet and outlet

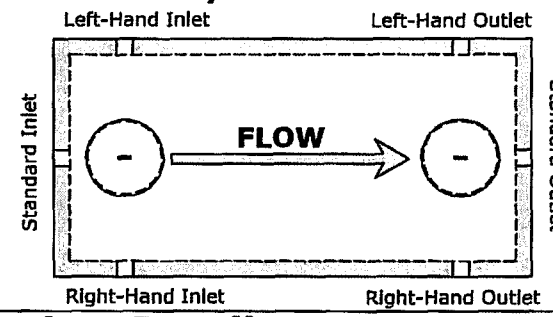


Tank Volume (gal.)	A (in.)	B (in.)	D (in.)	Width (in.)
1000 Lowboy	50	41	126	66
1000 (STEP)	60	49	120	60
1000 Mid-Seam (Field Line)	63	52.25	107	56
1000 H-20 Traffic Rated	58	45	132	72
1250	53	42.5	142	70
1500	60	49	142	70
1500 H-20 Traffic Rated	77.5	62	132	72
2100	67	51	180	78
2000 H-20 Traffic Rated	95.75	79	132	72
2500	72	59	180	78
2500 H-20 Traffic Rated	101.5	87.5	132	72
3000	82	69	180	78
3500	91	78	180	78
4000	101	88	180	78
4500	111	98	180	78
5000	122	107	180	78

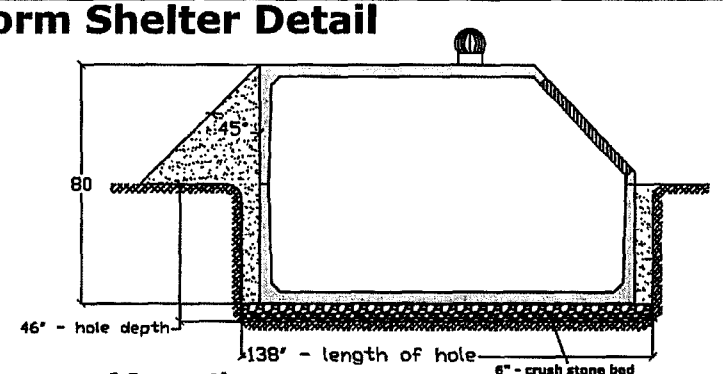
NPCA CERTIFIED PLANT

All left-hand and right-hand inlet and outlet pipe boots are **SPECIAL ORDER.**

Tank Inlet/Outlet Detail



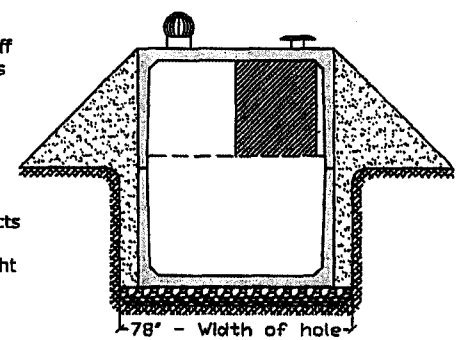
Storm Shelter Detail



Butyl Sealant: ASTM-C-990 Compliant

11 Degrees of Separation

- NPCA Certified Plant
- Watertight guarantee
- Civil engineering graduate on staff
- Two certified ACI field technicians on staff
- Quality assurance program
-
- High quality chemical resistant sealant
- Drawings/specifications of products available on website
- International supplier of watertight grease traps
- Unmatched product quality and durability
- **UNMATCHED SERVICE**

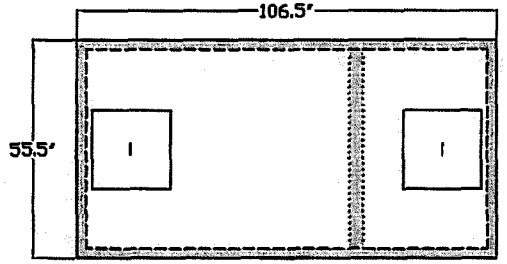


Manufactured by:
C.R. Barger & Sons, Inc.
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 Fax 865.882.6394
www.bargerandsons.com

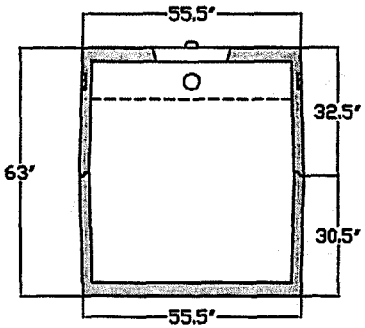
General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

Tank Type: General Detail
Date: 10.182006
Drawn By: Eric Barger
Approx. Weight:

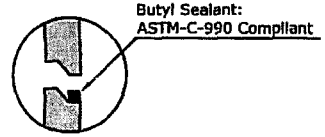
Top View



End View

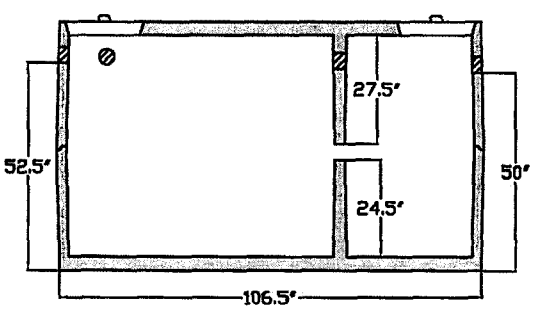


NPCA CERTIFIED PLANT

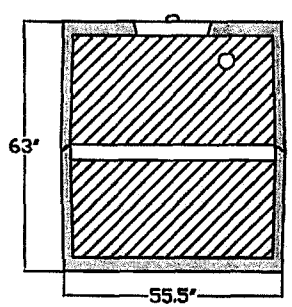


Side View

Both the inlet and outlet feature a high pressure pipe seal that will meet the Vacuum & Hydrostatic pressure requirements of A.S.T.M. spec. C-923 for 2", 3" & 4" SCH.40.



Baffle View



Specifications

Concrete: 5,000 psi minimum strength (28 day)

Reinforcing: Primary reinforcement will be top, side, and bottom #3 and/or #4 rebar (Grade 60) rebar.

Risers: All risers, if required, will be watertight and at least 8" in diameter.

Sealant: Sealant used in the seam of the tank will meet or exceed ASTM C990.

Pipe Penetrations: Inlet and outlets are fitted with seals that meet or exceed all ASTM C923 specifications.

Partition Wall: The partition wall, if present, is poured monolithically.

Installation: The tank hole is not to be more than one foot longer and wider than the tank. There shall be a minimum of 6" of $\frac{3}{4}$" stone bedding in soil terrain and a 12" stone bedding in rock terrain. Do not install across path of vehicles or heavy equipment. This tank is designed for one hundred fifty pounds per square foot (150 lb/ft2) uniform loading on the top of the tank with a maximum backfill cover of 36" and a minimum of 6".

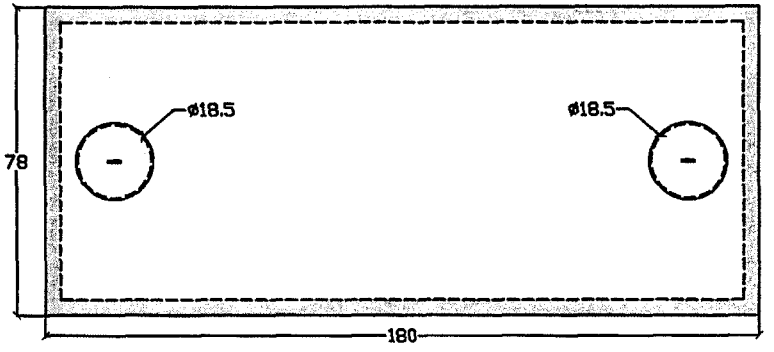
Tank Warranty: The C. R. Barger & Sons, Inc. septic tank when installed in accordance with manufacturer's instructions is warranted against defective materials and/or workmanship for 1 year from the date of delivery to the project site. Should a defect appear within the warranty period, C. R. Barger & Sons, Inc. will supply a new septic tank in replacement thereof. C. R. Barger & Sons, Inc. liability is limited to the value of the septic tank itself and specifically excludes the cost of installation and/or removal and consequential damages.
Failure to comply with C. R. Barger & Sons, Inc. installation procedures and general notes will void warranty.

Manufactured by:
C.R. Barger & Sons, Inc.
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 **Fax** 865.882.6394
www.bargerandsons.com

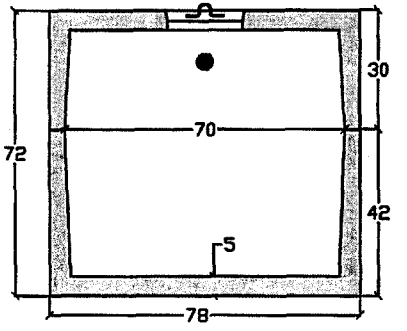
General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

Tank Type: Septic Tank 1000 Gallon Mid-Seam
Date: 3.252006
Approx. Weight: 8,000 lbs.
Drawn By: Eric Barger

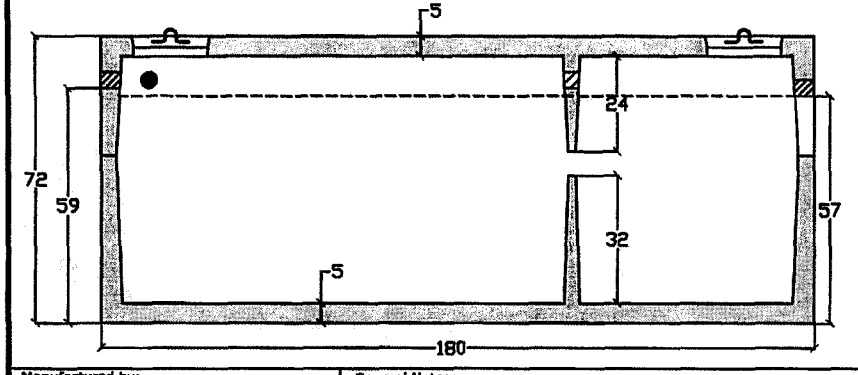
Top View



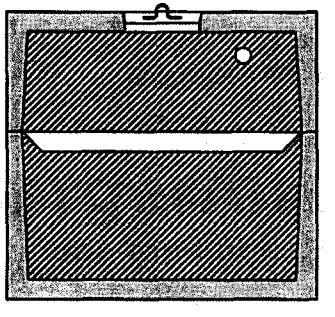
End View



Side View



Baffle View



Specifications

Concrete: 5,000 psi minimum strength (28 day)

Reinforcing: Primary reinforcement will be top, side, and bottom #3 and/or #4 rebar (Grade 60) rebar.

Risers: All risers, if required, will be watertight and at least 8" in diameter.

Sealant: Sealant used in the seam of the tank will meet or exceed ASTM C990.

Pipe Penetrations: Inlet and outlets are fitted with seals that meet or exceed all ASTM C923 specifications.

Partition Wall: The partition wall, if present, is poured monolithically.

Installation: The tank hole is not to be more than one foot longer and wider than the tank. There shall be a minimum of 6" of ¾" stone bedding in soil terrain and a 12" stone bedding in rock terrain. Do not install across path of vehicles or heavy equipment. This tank is designed for one hundred fifty pounds per square foot (150 lb/ft2) uniform loading on the top of the tank with a maximum backfill cover of 36" and a minimum of 6".

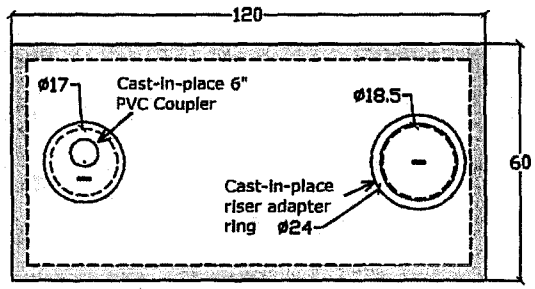
Tank Warranty: The C. R. Barger & Sons, Inc. septic tank when installed in accordance with manufacturer's instructions is warranted against defective materials and/or workmanship for 1 year from the date of delivery to the project site. Should a defect appear within the warranty period, C. R. Barger & Sons, Inc. will supply a new septic tank in replacement thereof. C. R. Barger & Sons, Inc. liability is limited to the value of the septic tank itself and specifically excludes the cost of installation and/or removal and consequential damages.
Failure to comply with C. R. Barger & Sons, Inc. installation procedures and general notes will void warranty.

Manufactured by:
C.R. Barger & Sons, Inc.
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 **Fax** 865.882.6394

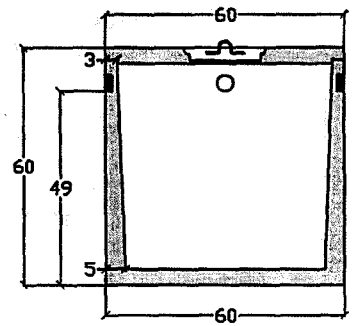
General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

Tank Type: Septic Tank 2500 Gallon
Date: 3.262006
Approx. Weight: 27,000 lbs.
Drawn By: Eric Barger

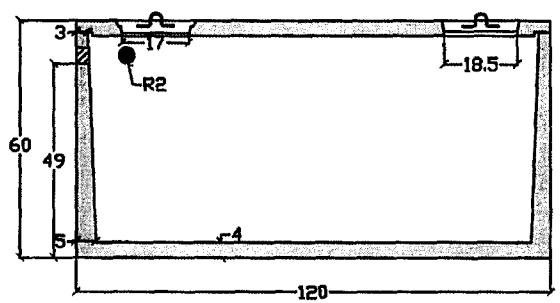
Top View



End View



Side View



Specifications

Concrete: 5,000 psi minimum strength (28 day)

Reinforcing: Primary reinforcement will be top, side, and bottom #3 and/or #4 rebar (Grade 60) rebar.

Risers: All risers, if required, will be watertight and at least 8" in diameter.

Sealant: Sealant used in the seam of the tank will meet or exceed ASTM C990.

Pipe Penetrations: Inlet and outlets are fitted with seals that meet or exceed all ASTM C923 specifications.

Partition Wall: The partition wall, if present, is poured monolithically.

Installation: The tank hole is not to be more than one foot longer and wider than the tank. There shall be a minimum of 6" of ¾" stone bedding in soil terrain and a 12" stone bedding in rock terrain. Do not install across path of vehicles or heavy equipment. This tank is designed for one hundred fifty pounds per square foot (150 lb/ft2) uniform loading on the top of the tank with a maximum backfill cover of 36" and a minimum of 6".

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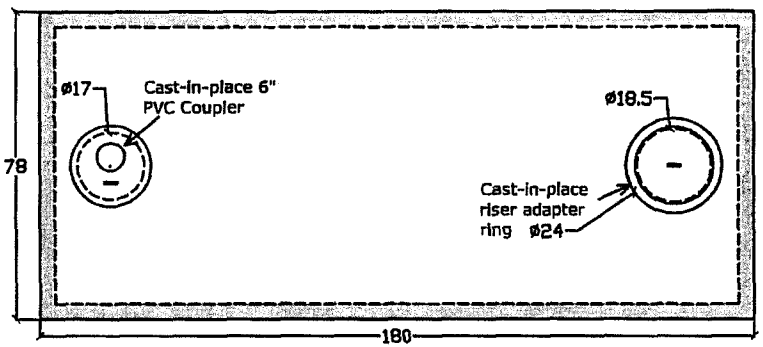
NPCA CERTIFIED PLANT

Manufactured by:
C.R. Barger & Sons, Inc.
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 **Fax** 865.882.6394
www.bargerandsons.com

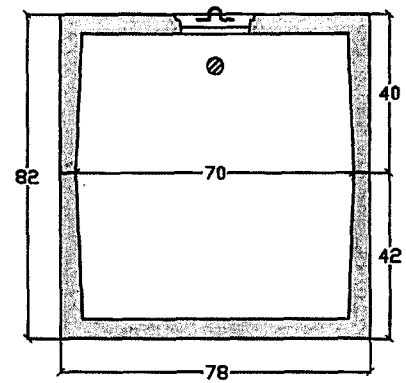
General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

Tank Type: Pump Tank 1000 Gallon	
Date: 3.252006	Approx. Weight: 10,000 lbs.
Drawn By: Eric Barger	

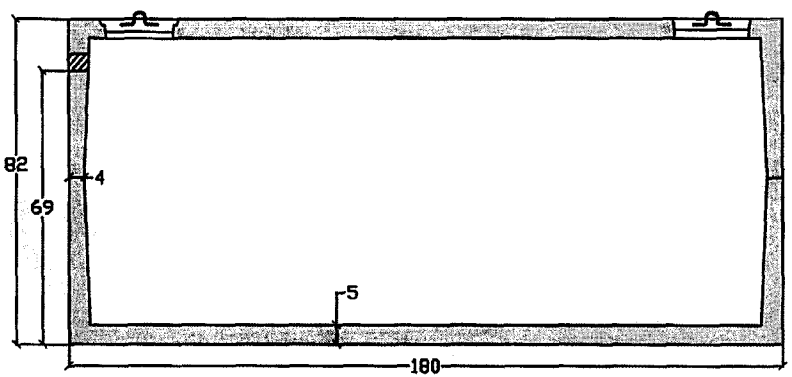
Top View

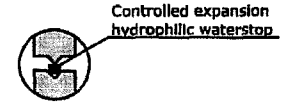


End View



Side View





NPCA CERTIFIED PLANT

Specifications

Concrete: 5,000 psi minimum strength (28 day)

Reinforcing: Primary reinforcement will be top, side, and bottom #3 and/or #4 rebar (Grade 60) rebar.

Risers: All risers, if required, will be watertight and at least 8" in diameter.

Sealant: Sealant used in the seam of the tank will meet or exceed ASTM C990.

Pipe Penetrations: Inlet and outlets are fitted with seals that meet or exceed all ASTM C923 specifications.

Partition Wall: The partition wall, if present, is poured monolithically.

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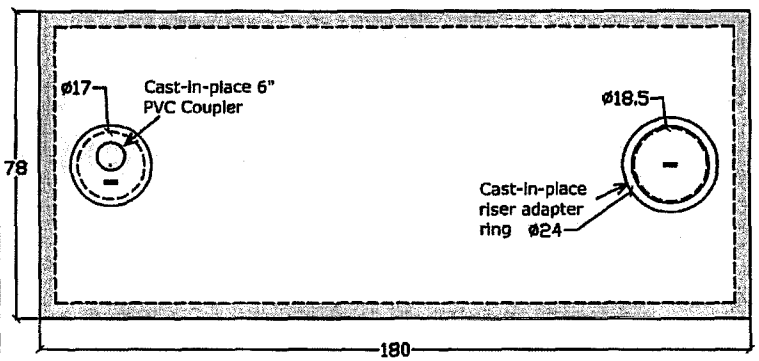
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 Fax 865.882.6394
www.bargerandsons.com

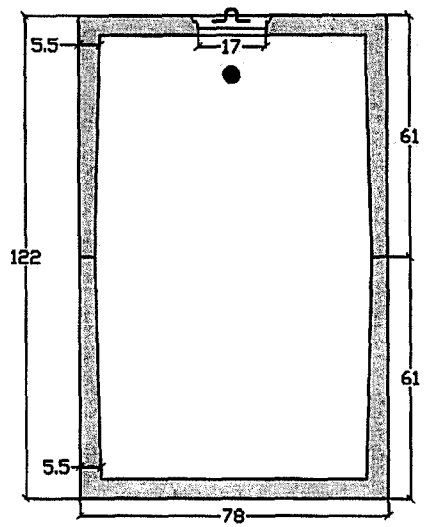
General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

Tank Type: Pump Tank 3000 Gallon Mid Seam
Date: 3.252006
Approx. Weight: 28,000 lbs.
Drawn By: Eric Barger

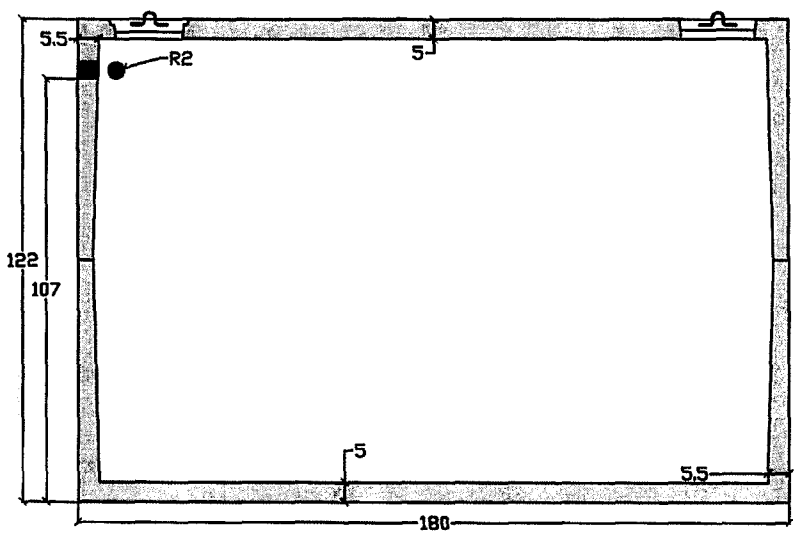
Top View

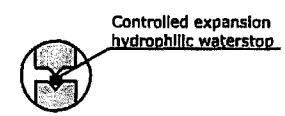


End View



Side View





Specifications

Concrete: 5,000 psi minimum strength (28 day)

Reinforcing: Primary reinforcement will be top, side, and bottom #3 and/or #4 rebar (Grade 60) rebar.

Risers: All risers, if required, will be watertight and at least 8" in diameter.

Sealant: Sealant used in the seam of the tank will meet or exceed ASTM C990.

Pipe Penetrations: Inlet and outlets are fitted with seals that meet or exceed all ASTM C923 specifications.

Partition Wall: The partition wall, if present, is poured monolithically.

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Failure to comply with C. R. Barger & Sons, Inc. installation procedures and general notes will void warranty.

NPCA CERTIFIED PLANT

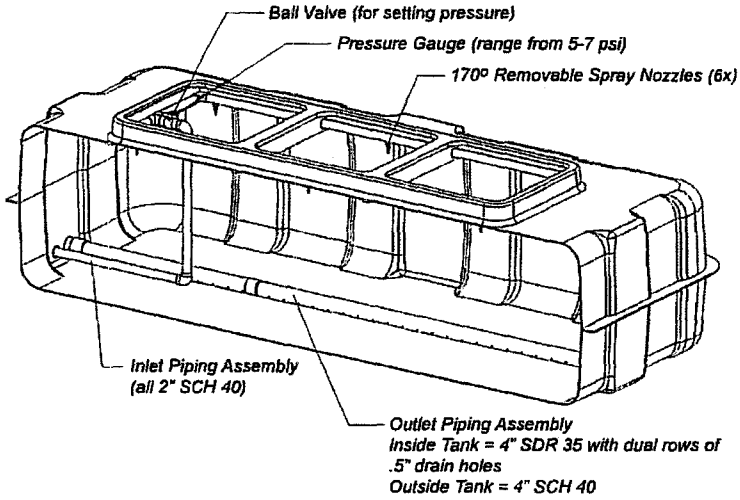
Manufactured by:
C.R. Barger & Sons, Inc.
238 Mays Valley Road
Harriman Tn 37748
Phone 865.882.5860 **Fax** 865.882.6394
www.bargerandsons.com

General Notes:
All vertical measurements are accurate within ± 1 inch on the tank. The lids can be moved and resized if necessary. Written specifications are available upon request.

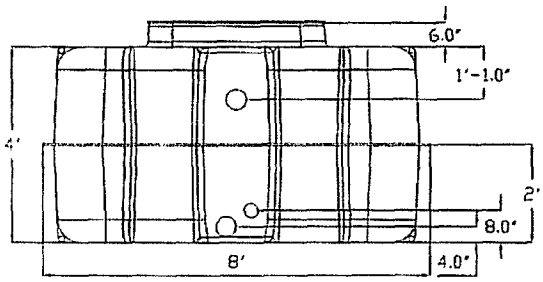
Tank Type: Pump Tank 5000 Gallon Mid-Seam	
Date: 3.252006	Approx. Weight: 39,000 lbs.
Drawn By: Eric Barger	

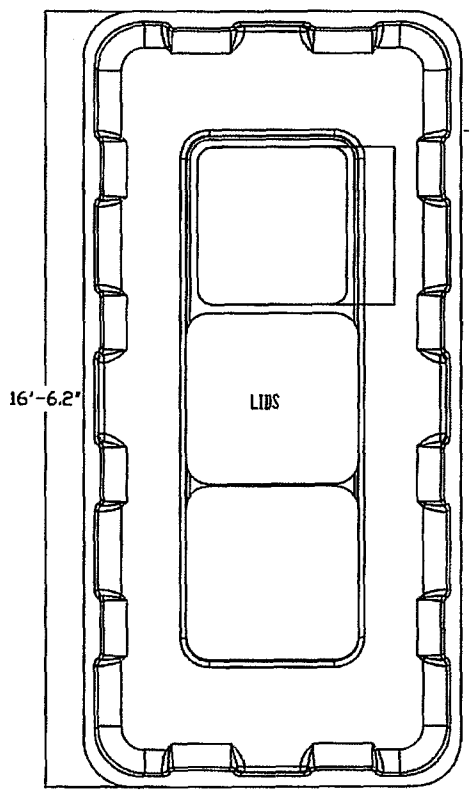
TechData

ADVANCED TREATMENT
Modules
ATS-16-AC/BC



Features
- Single module treats up to 5000 gallon per day
- Single-piece fiberglass construction
- Two filtering media options to choose from
- Treats wastewater to secondary or tertiary levels
- Vacuum tested to Florida's class III specifications





Materials

Treatment module
- FRP for corrosion and chemical resistance
- Single wall reinforced
- Sealed interior and exterior finish with no laminate exposure
- Stainless steel tamper resistant hardware

Effluent discharge and vent assembly
- 2.0" SCH 40 PVC piping intake, 4.0" SCH 40 discharge
- Oil-filled pressure gauge
- Ball valve
- Six PVC snap-on spray nozzles
- Carbon filter vent

Treatment options

AeroCell® open cell foam
- 400 ft^3 of open cell foam cubes
- Up to 12.5 gpd/ft^3 hydraulic loading rate
- Max of .031 lbs/ft^3/day organic loading rate
- Open cell foam contains 82% void space

Bio-COIR® natural media
- 400 ft^3 of media
- Up to 12.5 gpd/ft^3 hydraulic loading rate
- Max of .031 lbs/ft^3/day organic loading rate
- Fibrous media 45% lignin for superior resistance to biodegredation

Warranty for Defects in Material and Workmanship
- All components - 1 year

AutoCad R-14 dwg files at www.**quanics**.net

1-877-QUANICS - www.quanics.net

Quanics Water

DOWNLOAD AutoCAD DRAWINGS

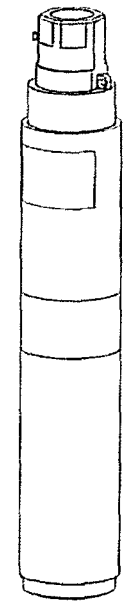
060409

TechData

STEP Systems

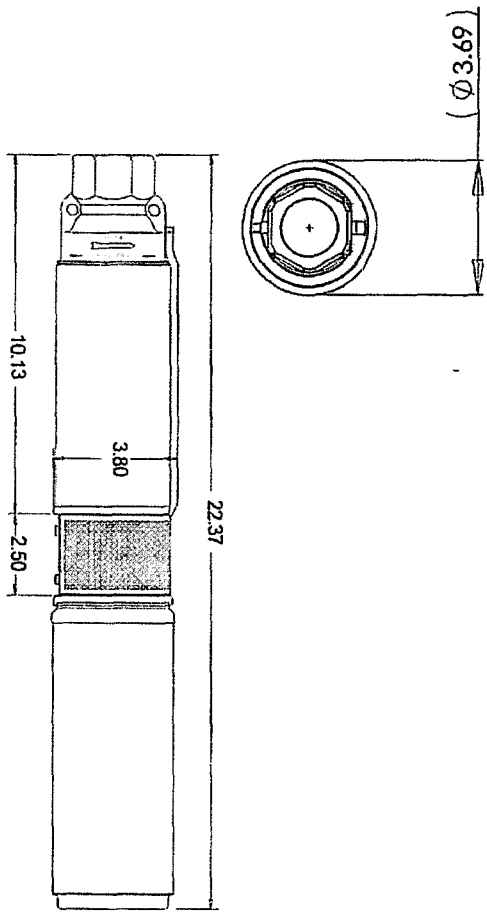
Pumps (Turbine Effluent)

P-TE-10, P-TE-20, P-TE-30, P-TE-50



Features

- Dry-run capability
- Patented Staging System handles sand conditions with ease
- Self-lubricating Nylatron® resists wear from sand
- 7/16" (12mm) positive drive 300 series stainless steel hexagonal shaft
- Carbon/Ceramic mechanical seal
- Ball bearing construction for long life



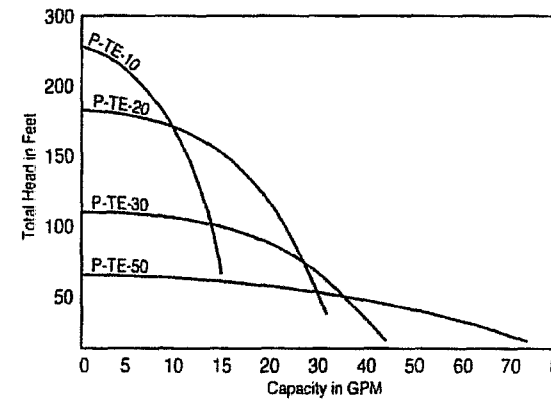
Specifications

Capacities: From 15 - 80 GPM
Heads: To 260 FT
Motor: 1/2 HP; hermetically sealed with automatic thermal overload
Electrical: 115V, 12.0 FLA, 1PH, 60Hz
Operation: Manual model (controls required)
Minimum Diameter: 4" (102mm)
Impeller: Delrin®, closed vane type
Solids handling: 1/8" (3.2mm)
Power Cord: 10' (3M), 300 V SJOW jacketed, 2-wire with ground
Materials of Construction: 300 grade stainless and cast-iron
Discharge: 10, 20, 30 GPM = 1-1/4"; 50 GPM = 2"

Warranty for Defects in Material and Workmanship

- All components - 3 Years

AutoCad R-14 dwg files at **www.quanics.net**



Quanics
Engineering Water Solutions

Prepared by: SEC. Inc. 5/26/2011 Project: Arrington Vineyard (Williamson County)

final dose/flush to drip fields

Design Flow Rate	18.1	
Distributing Valve Model (# of Zones)	none	
Lift to Distribution Point	5.0	feet
Discharge Assembly Size	1.50	
Transport Line Size	2.00	inches
Pipe Class/Schedule	200	
Transport Length	1100	feet
Flow Meter	none	
'Add-on' Head Loss	76	feet

Friction Head Losses:

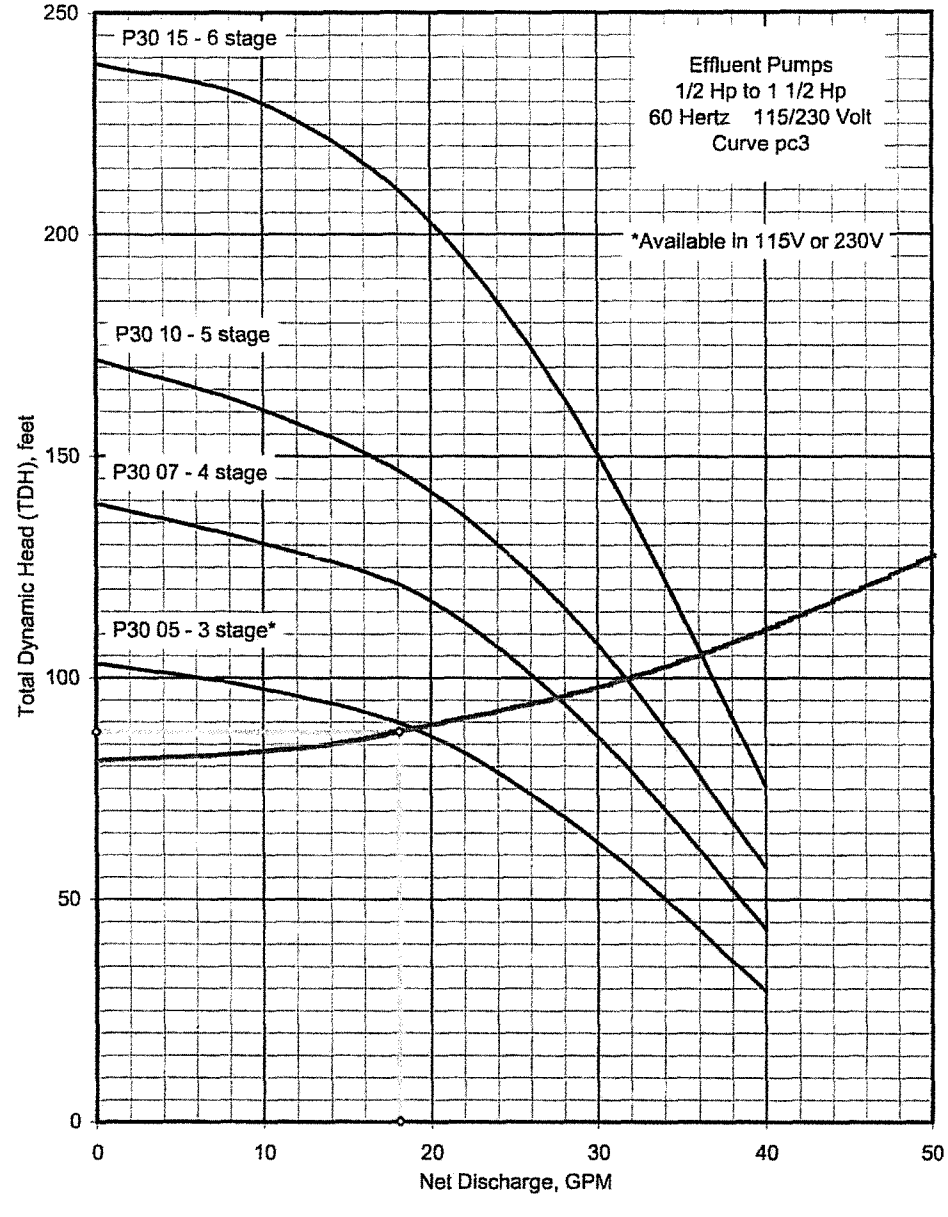
Head Loss in Transport Pipe	5.6 feet
Head Loss through Discharge Assembly	1.0 feet
Head Loss through Distributing Valve	0.0 feet
Head Loss through Flow Meter	0.0 feet

Size Pump for:

DESIGN FLOW RATE **18.1**

@

TOTAL DYNAMIC HEAD **87.8**



STA-RITE

high head multi-stage submersible effluent pumps

ORDERING INFORMATION

Catalog Number	HP	Stages	Max. Load Amps	Volts	Phase/ Cycles	Cord Length
STEP10	1/2	6	10.5	115	1/60	10'
STEP20	1/2	5	10.5	115	1/60	10'
STEP30-05121	1/2	3	9.5	115	1/60	10'
STEP30X20FT-05121	1/2	3	9.5	115	1/60	20'
STEP30X30FT-05121	1/2	3	9.5	115	1/60	30'
STEP30-05221	1/2	3	4.7	230	1/60	10'
STEP30X20FT-05221	1/2	3	4.7	230	1/60	20'
STEP30X30FT-05221	1/2	3	4.7	230	1/60	30'
STEP30-10221	1	5	9.1	230	1/60	10'
STEP30X20FT-10221	1	5	9.1	230	1/60	20'
STEP30X30FT-10221	1	5	9.1	230	1/60	30'
STEP30-15221	1-1/2	6	11.0	230	1/60	10'
STEP30X20FT-15221	1-1/2	6	11.0	230	1/60	20'
STEP30X30FT-15221	1-1/2	6	11.0	230	1/60	30'
STEP50-10221	1	3	9.1	230	1/60	10'
STEP50X20FT-10221	1	3	9.1	230	1/60	20'
STEP50X30FT-10221	1	3	9.1	230	1/60	30'
STEP50-15221	1-1/2	4	11.0	230	1/60	10'
STEP50X20FT-15221	1-1/2	4	11.0	230	1/60	20'
STEP50X30FT-15221	1-1/2	4	11.0	230	1/60	30'

PUMP PERFORMANCE

Catalog Number	Gallons/Liters per Minute	Head (Feet/Meters)	PSI
STEP10	0/0	255/78	110
	5/19	228/69	99
	10/38	170/52	74
	12.5/47	120/37	52
STEP20	0/0	180/55	78
	7.5/28	160/49	69
	15/57	135/41	58
	20/76	115/35	50
	25/95	75/23	32
STEP30-05221 & STEP30-05121	0/0	102/31	44
	8/30	100/30	43
	16/61	97/30	42
	24/91	84/26	36
	30/114	68/21	29
	36/136	47/14	20
STEP30-10221	0/0	171/52	74
	8/30	166/51	72
	16/61	162/49	70
	24/91	140/43	61
	30/114	114/35	49
	36/136	78/24	34
STEP30-15221	0/0	206/63	89
	8/30	203/62	88
	16/61	199/61	86
	24/91	176/54	76
	30/114	146/45	63
	36/136	101/31	44
STEP50-10221	0/0	90/27	39
	10/38	86/26	37
	20/76	83/25	36
	30/114	79/24	34
	40/152	71/22	31
	50/190	62/19	27
	60/227	49/15	21
	70/265	27/8	12
STEP50-15221	0/0	120/37	52
	10/38	115/35	50
	20/76	110/34	48
	30/114	104/32	45
	40/152	95/29	41
	50/190	82/25	35
	60/227	65/20	28
	70/265	36/11	16

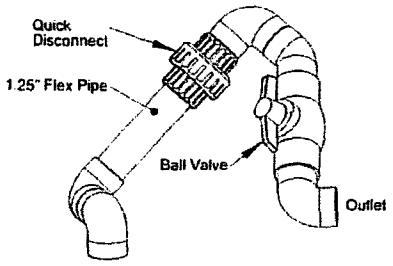
TechData

Pump Discharges (Flexible)

PDS-EDF-1.25, PDS-EDF-1.5, PDS-EDF-2.0
PDS-EDF-1.25-D, PDS-EDF-1.5-D, PDS-EDF-2.0-D

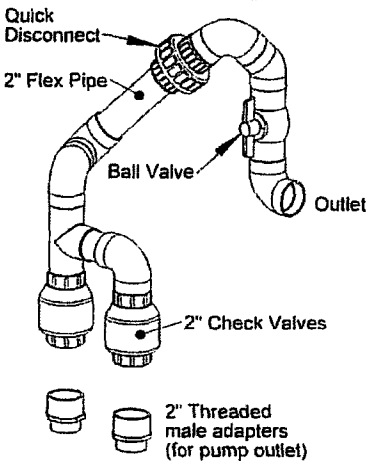
Features

- Ideal for effluent, sewage or high head turbine pump applications
- Pre-assembled for quick installation
- Newly designed for easier STEP system maintenance
- Includes flex tubing for easy installation and maintenance

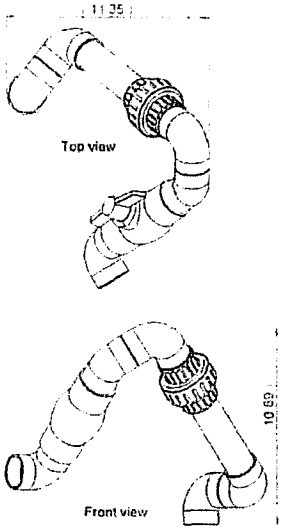


1.25" Single discharge

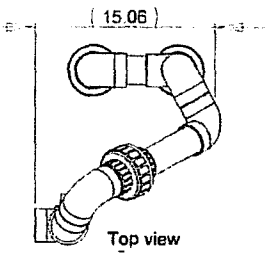
2" Dual discharge

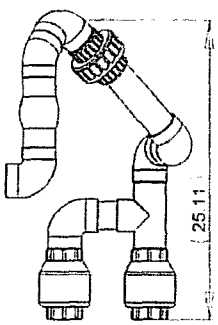


1.25" Single discharge



2" Dual discharge





Materials

Pipe

- SCH 40 PVC
- PVC flex tubing

Ball valve

- PVC plastic
- Double block, full port design
- Slip/slip hubs

Check valve

- PVC plastic swing type (duplex model only)

Fittings

- SCH 40 PVC threaded/slip adapter
- SCH 40 PVC slip/slip adapter

Warranty for Defects in Material and Workmanship

- 1 Year

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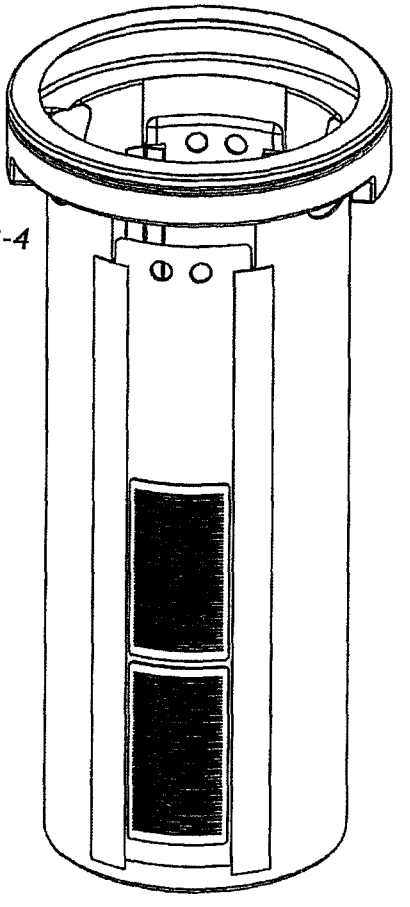
Pricing page 15

TechData

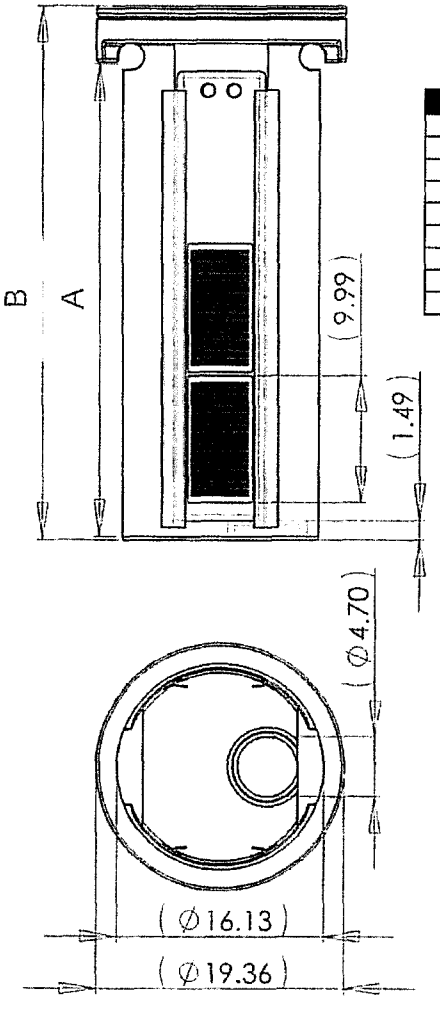
Filtered Pump Vaults (Hanging)

FPV-H36-4, FPV-H44-4, FPV-H50-4, FPV-H56-4, FPV-H62-4, FPV-H68-4, FPV-H84-4, FPV-H96-4, FPV-H102-4



Features

- *Hanging filtered pump vault installs into primary or pump tanks*
- *Protects pump and disposal field from solids larger than 1/16"*
- *All models available with 4 filter plates*
- *Includes maintenance plate for servicing ease*
- *Available in 36", 44", 50", 56", 62", 68", 84", 96", and 102" hanging lengths*



PART	A	B
FPV-H36-4	36"	39"
FPV-H44-4	44"	47"
FPV-H50-4	50"	53"
FPV-H56-4	56"	59"
FPV-H62-4	62"	65"
FPV-H68-4	68"	71"
FPV-H84-4	84"	87"
FPV-H96-4	96"	99"
FPV-H102-4	102"	105"

Materials

Vault

- *High density non-corrosive polyethylene plastic*
- *Stainless steel screws*
- *Polypropylene filter panels*

Warranty for Defects in Material and Workmanship

- *1 Year*

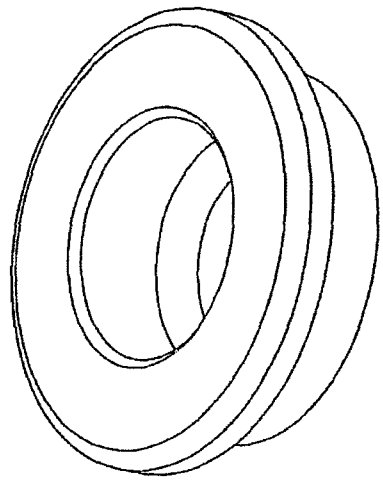
AutoCad dwg files at ***www.quanics.net***

Pricing page 12-13

TechData

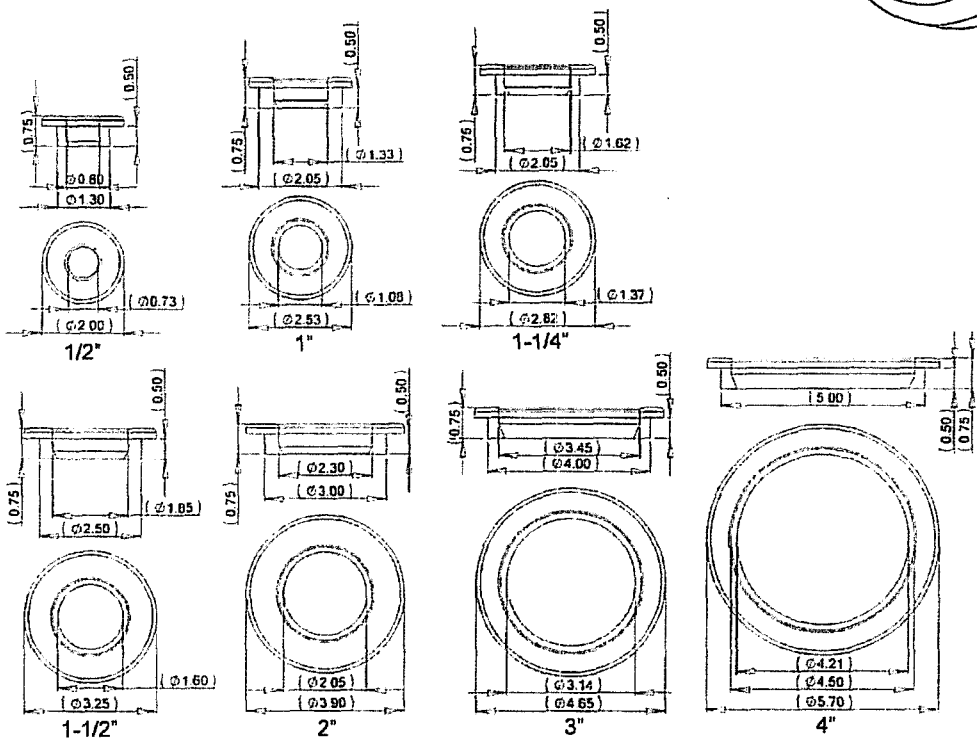
Grommets

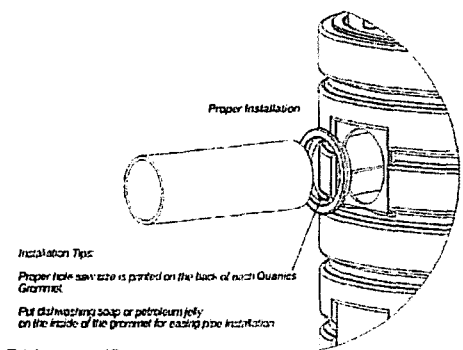
PDS-GT-.50, PDS-GT-1.0, PDS-GT-1.25, PDS-GT-1.5, PDS-GT-2.0 PDS-GT-3.0, PDS-GT-4.0-35, PDS-GT-4.0-40



Features

- Rubber grommets may be installed in plastic or fiberglass risers/tanks
- Create a watertight seal around a variety of pipe diameters
- Install using an appropriately sized hole saw as listed on the back of each grommet





Pricing page 13

Materials

- Flexible PVC

Warranty for Defects in Material and Workmanship

- 1 Year

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Quanics Water

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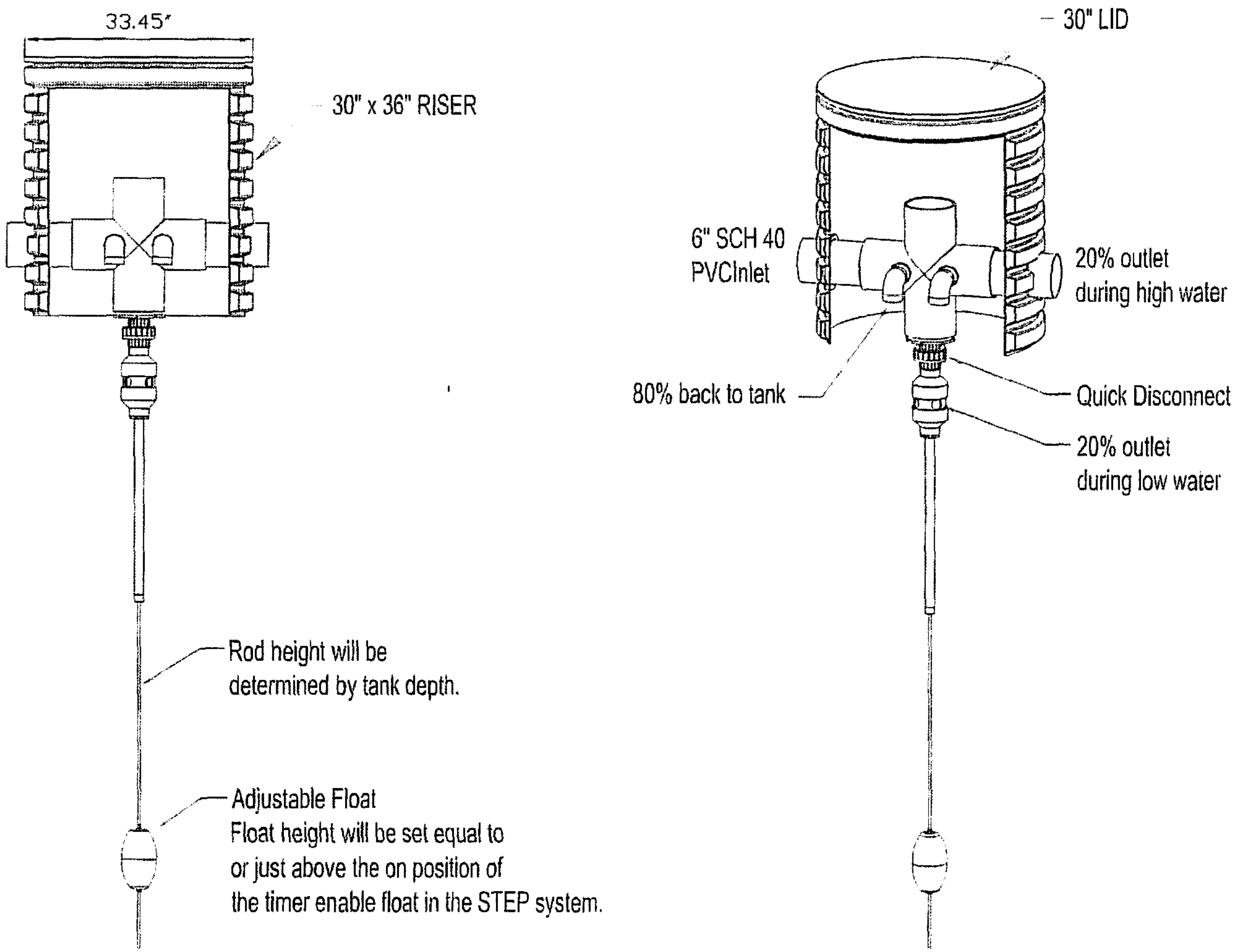
NOTE: FLOW NOT TO EXCEED 204 GPM

DRAWING NAME - 6' 100/80/20 RECIRCULATION DEVICE
QUANICS PART # - ATS-GRD-100/80/20-6



GRAVITY LINES
PRESSURE LINES
QUANICS COMPONENTS
NON-QUANICS COMPONENTS
SYSTEM FOOTPRINT

Quanics Contacts - Technical		AutoCad Drawings
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Product(s) covered by one or more U.S. and/or International patents. Other U.S. and International patents may be pending.

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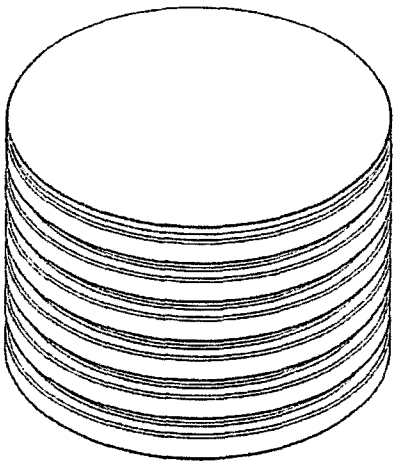
TechData

Risers & Lids

(30" Diameter)

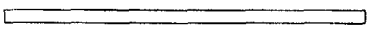
RB-L-30, RB-R-30x12, RB-R-30x24, RB-R-30x36, RB-R-30x48, RB-R-30x60, RB-R-30x72, RB-R-30x84



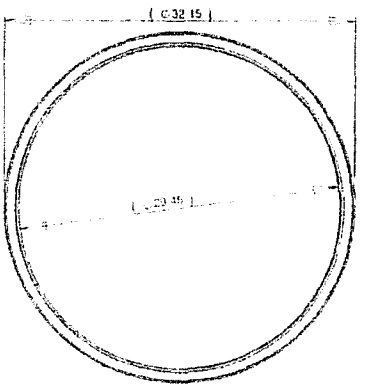
Features:

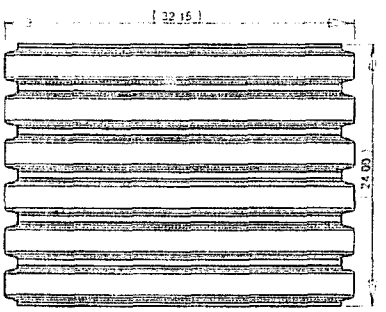
- *Heavy duty for deep installations*
- *Larger diameters provide easier access to buried components*
- *May be cast-in or retrofit to any concrete tank*
- *Heights available in 1' increments up to 7'*

RB-L-30 (Lid)

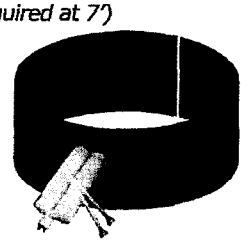


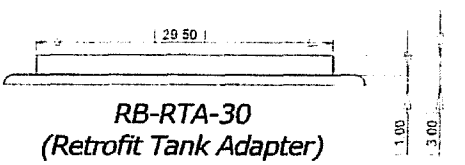
RB-R-30x24 (Riser)



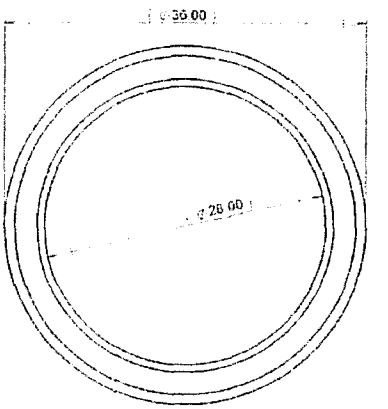


Splice kits available and (required at 7')





RB-RTA-30
(Retrofit Tank Adapter)



All retrofit tank apapters includes tank bolt-down kit (RB-RTA-BK)
Contents:
Bolt-down anchors
Sealant
Riser adhesive

Materials:

Risers and lids

- *High density PVC*
- *Stainless steel screws*

Warranty for Defects in Material and Workmanship

- *2 Years*

IMPORTANT:

- *When adding risers together for deeper installations Quanics does not recommend exceeding a maximum depth of 14'*
- *Supplied bolt-down kit and/or riser adhesive must be installed as per instructions*
- *To prevent unauthorized entry install all fasteners as per instructions*

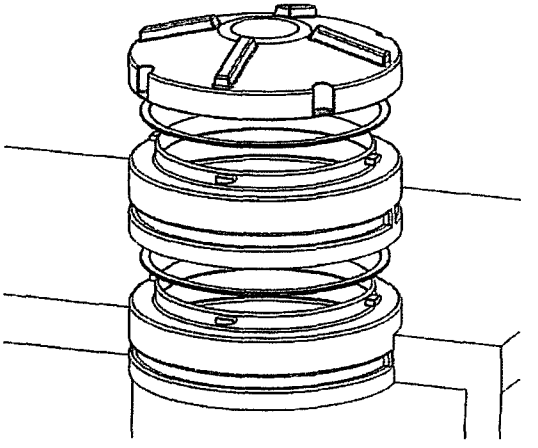
*AutoCad files at www.**quanics**.net*

Pricing page 17

TechData

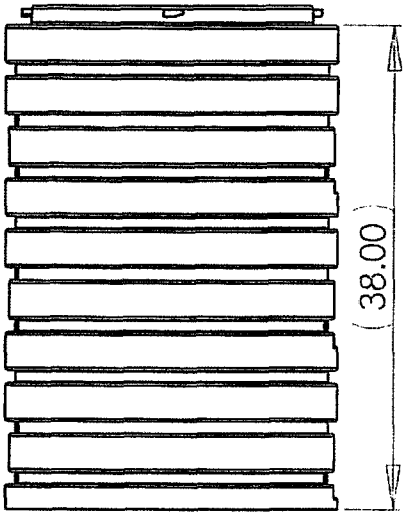
Risers & Lids

(26" Diameter) Continued

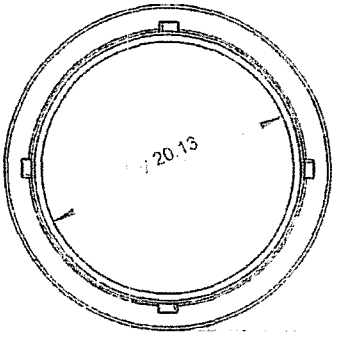


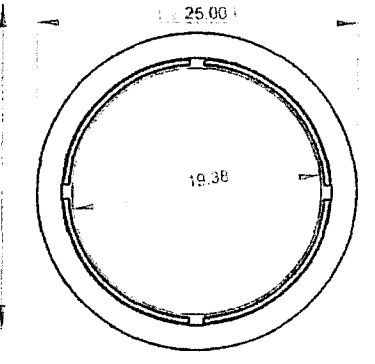
Features:

- *Patented 26" polyethylene risers*
- *All components include twist lock tabs*
- *Tamper resistant fasteners included with each lid*
- *Tested to withstand up to 2500 lb wheel load*
- *May be cast-in or retrofit to any concrete tank*

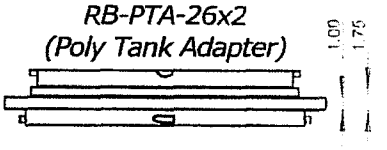


RB-R-26x38 (Riser)

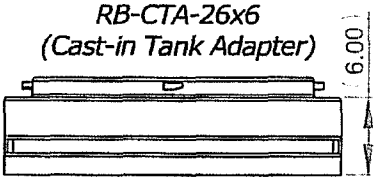


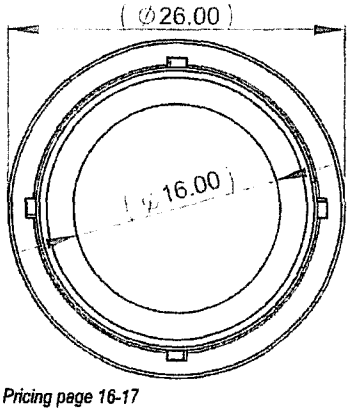


RB-PTA-26x2
(Poly Tank Adapter)



RB-CTA-26x6
(Cast-in Tank Adapter)





Pricing page 16-17

Materials:

Risers and lids

- *High density non-corrosive polyethylene plastic*
- *Stainless steel screws*
- *Neoprene gasket*

Warranty for Defects in Material and Workmanship

- *Risers and Lids - 2 Years*

IMPORTANT:

- *When adding risers together for deeper installations Quanics does not recommend exceeding a maximum depth of 50".*
- *Neoprene gaskets must be installed as per instructions*
- *To prevent unauthorized entry install all tamper resistant fasteners as per instructions*

*AutoCad files at **www.quanics.net***

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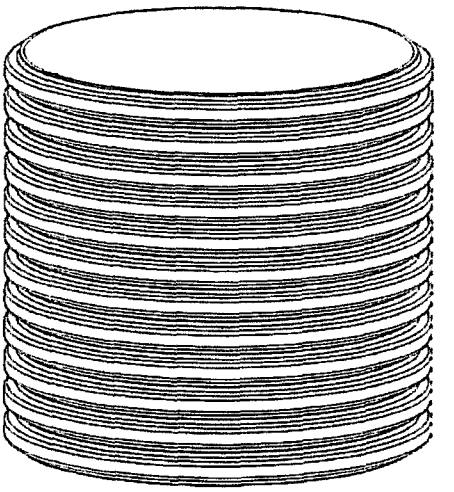
TechData

Risers & Lids

(24" Diameter)

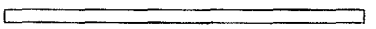
RB-L-24, RB-R-24x12, RB-R-24x24, RB-R-24x36, RB-R-24x48, RB-R-24x60, RB-R-24x72, RB-R-24x84



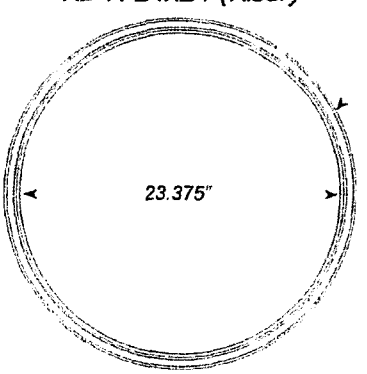
Features:

- *Heavy duty for deep installations*
- *Larger diameters provide easier access to buried components*
- *May be cast-in or retrofit to any concrete tank*
- *Heights available in 1' increments up to 7'*

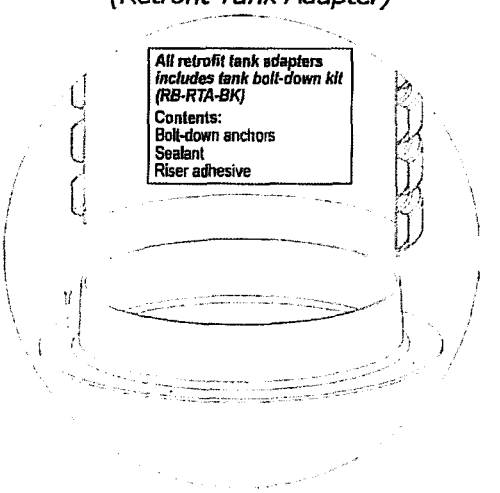
RB-L-24 (Lid)

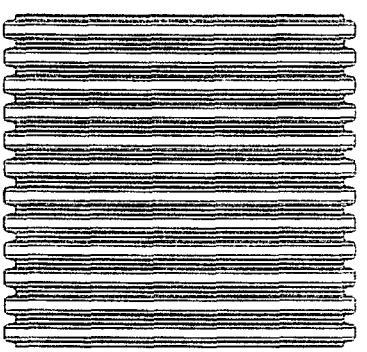


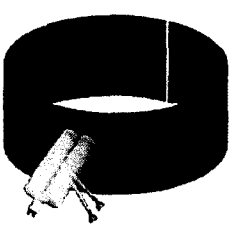
RB-R-24x24 (Riser)



RB-RTA-24
(Retrofit Tank Adapter)







Splice kits available and recommended at 7'

Materials:

Risers and lids

- *High density PVC*
- *Stainless steel screws*

Warranty for Defects in Material and Workmanship

- *1 year from date of purchase*

IMPORTANT:

- *When adding risers together for deeper installations Quanics does not recommend exceeding a maximum depth of 14'*
- *Supplied bolt-down kit and/or riser adhesive must be installed as per instructions*
- *To prevent unauthorized entry install all fasteners as per instructions*

*AutoCad files at www.**quanics**.net*

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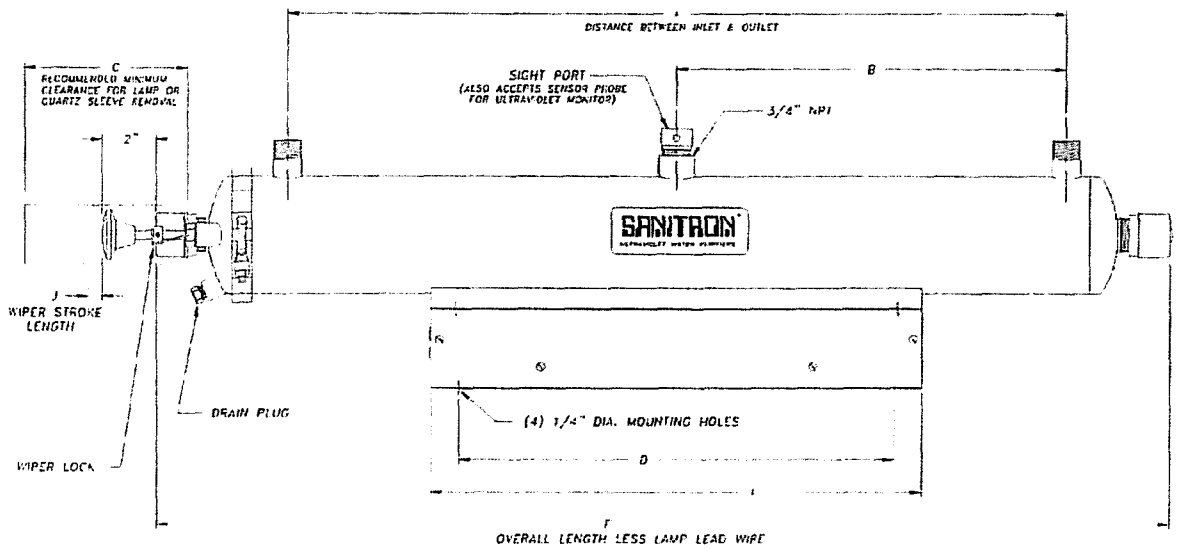
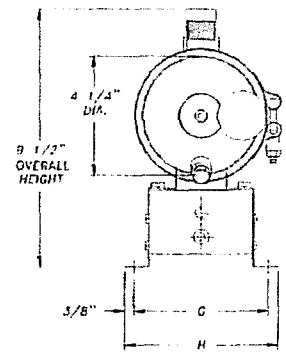
6. UV Treatment

TechData

Model #s ATS-PUV-3
ATS-PUV-6
ATS-PUV-12
ATS-PUV-20

Disinfection
Pressure UV Disinfection Units (3, 6, 12 & 20 gpm)





Rated Flow Rate	3 GPM	6 GPM	12 GPM	20 GPM
Inlet/Outlet size	3/4" m NPT	3/4" m NPT	1" m NPT	1-1/2" m NPT
Replacement Lamp	GPH287T5L	GPH436T5L	G36T6L	G48T6L
Power Consumption	18 watts	24 watts	44 watts	54 watts
Lamp output	14 watts	20 watts	39 watts	50 watts
Effective Life	10,000 hours	10,000 hours	10,000 hours	10,000 hours
Shipping Weight	11 lbs.	14 lbs.	22 lbs.	36 lbs.
Voltage	120V	120V	120V	120V
Max Operating Pressure	100 PSI	100 PSI	100 PSI	100 PSI

MODEL	A	B	C	D	E	F	G	H	J
ATS-PUV-3	8-3/4"	17"	8-3/4"	10"	17-3/8"	3-5/8"	4-5/16"	8-3/16"	7-3/16"
ATS-PUV-6	14-3/4"	23"	13-1/4"	14-1/2"	23-3/8"	3-5/8"	4-5/16"	8-3/16"	10-3/16"
ATS-PUV-12	28-1/2"	37"	16"	18"	37-3/8"	4-15/16"	5-11/16"	9-1/2"	11-1/8"
ATS-PUV-20	40-7/8"	50"	26"	30"	50-3/8"	4-15/16"	5-11/16"	9-1/2"	13-13/16"

7. Drip Emitter Line

Daily Flow

Arrington Vineyards Total Daily Flow	7,100 gpd

Land Application Area

Land Application Area	0.25 gal/sf/day*
Total Area Required	28400 s.f.
or	0.65 acres

* assummed soil absorption rate

Number of Required Zones

Length per zone (@ 5' o.c.)	2840 L.F.
Number of Zones	2.0 Zones

GEOFLOW SUBSURFACE DRIP	Field Flow

Job Description:	
Contact:	
Prepared by:	
Date:	*24-Jul-09*

Please fill in the shaded areas and drop down menus:
This spreadsheet serves as a guide, and is not a complete hydraulic design.

Worksheet 1- Field Flow

Total field

	Total Quantity of effluent to be disposed per day	7,100	gallons / day	note
	Hydraulic loading rate	0.25	gallons / sq.ft. / day	note
	Minimum Dispersal Field Area	28,400	square ft.	note
	Total Dispersal Field Area	28,400	square ft.	note

Flow per zone

	Number of Zones	**2**	zone(s)	note
	Dispersal area per zone	14,200	square ft.	note
	Choose line spacing between WASTEFLOW lines	5	ft.	note
	Choose emitter spacing between WASTEFLOW emitters	2	ft.	note
	Total linear ft.per zone (minimum required)	2,840	ft. per zone	note
	Total number of emitters per zone	1,420	emitters per zone	note
	Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph	dripline	note
	Pressure at the beginning of the dripfield	20	psi	note
	Feet of Head at the beginning of the dripfield	46.2	ft.	note
	What is the flow rate per emitter in gph?	0.53	gph	note
	Dose flow per zone	**12.54**	**gpm**	note

Note: A few States or Counties require additional flow for flushing. Please check your local regulations.
Flush velocity calculation below is for PC dripline. Classic dripline requires less flow to flush than PC.
Please refer to Geoflow's spreadsheet "Design Flow and Flush Curves" at www.geoflow.com or call 800-828-3388.

	If required, choose flush velocity	2	ft/sec	note
	How many lines of WASTEFLOW per zone?	16	lines	note
	Fill in the *actual* length of longest dripline lateral	290	ft.	note
	Flush flow required at the end of each dripline	1.48	gpm	note
	Total Flow required to achieve flushing velocity	23.68	gpm	note
	Total Flow per zone- worst case scenario	**36.23**	**gpm**	note

Select Filters and zone valves

	Select Filter Type	**BioDisc Filter**		note
	Recommended Filter (item no.)	BioDisc-200	2" Disc Filter 30-60gpm	note
	Select Zone Valve Type	**Electric Solenoid**	-	note
	Recommended Zone Valve (item no.)	SVLVB-150	1.5-in. Solenoid valve	note

Dosing

	Number of doses per day / zone:	12	doses	note
	Timer ON. Pump run time per dose/zone:	23.35	mins:secs	23.58
	Timer OFF. Pump off time between doses	1:36	hrs:mins	1.61
	Per Zone - Pump run time per day/zone:	4:43	hrs:mins	4.72
	All Zones - Number of doses per day / all zones	24	doses / day	
	Allow time for field to pressurize	0:00:30	hrs:mins:secs	0.500
	Filter flush timer	0:00:20	hrs:mins:secs	0.333 n
	Drain timer	0:05:00	hrs:mins:secs	5.000 n
	Field flush timer	0:01:00	hrs:mins:secs	1.000 n
	Field flush counter	3	cycles	note
	Time required to complete all functions per day	**12:10**	hrs:mins	12.1673
Dose volume per zone		296	gallons per dose	note

Allow time in the day for controller to have pressurization and drainage time.

GEOFLOW SUBSURFACE DRIP

Pump Size

Job Description:	Arrington Vinyards
Contact:	Jeff Cox
Prepared by:	Jamie Reed
Date:	7/24/2009

Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW Classic
The letters on the diagram(right) match the letters in section 2 below.

Worksheet - Pump Sizing

Section 1 - Summary from Worksheet 1		
Flow required to dose field	12.54	gpm
Flow required to flush field	23.68	gpm
Flow required to dose & flush field	36.23	gpm
Filter	BioDisc-200	
No. of Zones	2	zones
Zone valve	SVLVB-150	
Dripline	Wasteflow PC - 1/2gph	
Dripline longest lateral	290.00	ft.

Section 2	Ft of head	Pressure
A. Flush line - Losses through return line		
Size of flush line in inches	2 inch	
Length of return line	1100 ft.	
Equivalent length of fittings	5 ft.	
Elevation change. (if downhill enter 0)	**0** ft.	
Pressure loss in 100 ft of pipe	1.35 ft.	0.58 psi
Total pressure loss from end of dripline to return tank	*14.9 ft.*	6.44 psi

3. Dripline - **Losses through Wasteflow dripline**		
Length of longest dripline lateral	**290** ft.	
Minimum dosing pressure required at end of dripline	23.10 ft.	10.00 psi
Loss through dripline during flushing	82.86 ft.	35.87 psi
Total minimum required dripline pressure	*105.96 ft.*	35.87 *psi*

A+B. Minimum Pressure required at beginning of dripfield		
CALCULATED pressure required at beginning of dripfield	*120.83 ft.*	52.31 *psi*
SPECIFIED pressure at beginning of dripfield (from worksht 1)	**46.2 ft.**	20.00 *psi*
!!! Urgent revision required SPECIFIED pressure must be greater than CALCULATED pressure and lowe		

C. Drip components - **Losses through headworks**		
Filter	1.8 ft.	0.80 psi
Zone valve pressure loss (not in diagram)	2.08 ft.	0.90 psi
Flow meter pressure loss (not in diagram)	ft.	- psi
Other pressure losses	ft.	- psi
Total loss through drip components	**3.93 ft.**	1.70 psi

D. Supply line - **Minimum Pressure head required to get from pump tank to top of dripfield**		
Size of supply line in inches	2 inch	
Length of supply line	1100 ft.	
Equivalent length of fittings	5 ft.	
Height from pump to tank outlet	5 ft.	
Elevation change. (if downhill enter 0)	0 ft.	
Pressure loss/gain in 100 ft. of pipe	2.96 ft.	1.28 psi
Total gain or loss from pump to field	*37.7 ft.*	16.30 psi
Total dynamic head	**87.8 ft.**	38.00 *psi*
Pump capacity *	**36.2 gpm**	
Pump Model Number	**STEP30-10221**	
Voltz / Hp / phase	**115volts/0.5hp/ (1/60phase/cycl**	

Dripline Tables

Refer to Geoflow's Flow and flushing worksheet for further hydraulic details

Wasteflow Classic

Flow Rate vs. Pressure

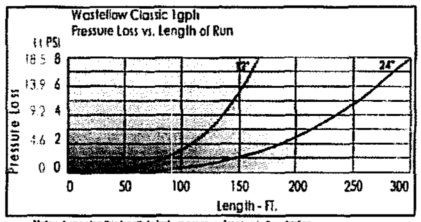
Pressure		Dripline	
psi	ft	WF16-4-24	WF16-4-12
10 psi	23.10 ft	0.90 gph	0.91 gph
15 psi	34.65 ft	1.13 gph	1.13 gph
20 psi	46.20 ft	1.30 gph	1.30 gph
25 psi	57.75 ft	1.47 gph	1.47 gph
30 psi	69.30 ft	1.62 gph	1.62 gph
35 psi	80.85 ft	1.76 gph	1.76 gph
40 psi	92.40 ft		
45 psi	103.95 ft	1.99 gph	1.99 gph

Maximum Length of Run vs. Pressure

Flow variation +/- 5%

Pressure		Emitter Spacing		
psi	ft	24"	18"	12"
10 psi	23.10 ft	170	185	100
15 psi	34.65 ft	170	185	100
20 psi	46.20 ft	170	185	100
25 psi	57.75 ft	170	185	100
30 psi	69.30 ft	170	185	100
35 psi	80.85 ft	170	185	100
40 psi	92.40 ft	170	185	100
45 psi	103.95 ft	170	185	100

kd = .9, cv = <.05



Note: when using this length to look up pressure losses in the dripline, only the flow going out of the emitters is used, and does not reflect true pressure loss during flushing. Pressure loss during flushing is self calculated in the cell below, or can be obtained from Geoflows Flushing spreadsheet.

Wasteflow PC 1/2 gph

Flow Rate vs. Pressure

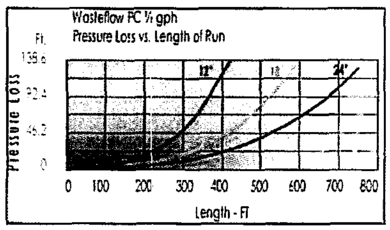
Pressure	Head	Dripline WFPC16-2-24	Dripline WFPC16-2-12
7-45 psi	16-103 ft	0.53 gph	0.53 gph

Maximum Length of Run vs. Pressure

Allows a maximum of 10 psi

Pressure		Emitter Spacing			
psi	ft	6"	12"	18"	24"
10 psi	23.10 ft				
15 psi	34.65 ft		174	260	321
20 psi	46.20 ft	120	228	330	424
25 psi	57.75 ft		269	377	478
30 psi	69.30 ft	150	285	415	530
35 psi	80.85 ft		313	446	570
40 psi	92.40 ft	172	340	478	612
45 psi	103.95 ft		354	501	651
			363	529	678
			377	544	700
			403	563	777

kd = 2.070
Not recommended
with pressures
greater than 45 psi



Note: when using this length to look up pressure losses in the dripline, only the flow going out of the emitters is used, and does not reflect true pressure loss during flushing. Pressure loss during flushing is self calculated in the cell below, or can be obtained from Geoflows Flushing spreadsheet.

Wasteflow PC 1 gph

Flow Rate vs. Pressure

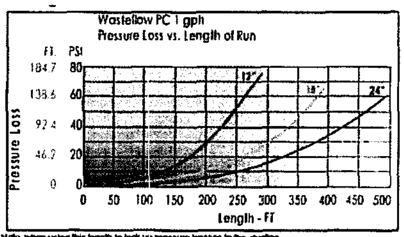
Pressure	Head	Dripline WFPC16-4-24	Dripline WFPC16-4-12
7-45 psi	16-103 ft	1.02 gph	1.02 gph

Maximum Length of Run vs. Pressure

Allows a maximum of 10 psi

Pressure		Emitter Spacing			
psi	ft	6"	12"	18"	24"
10 psi	23.10 ft	50	85	140	176
15 psi	34.65 ft	63	110	177	211
20 psi	46.20 ft	74	146	210	265
25 psi	57.75 ft	88	171	242	315
30 psi	69.30 ft	94	180	266	335
35 psi	80.85 ft	105	199	287	376
40 psi	92.40 ft	110	211	305	385
45 psi	103.95 ft	118	222	321	420
			227	334	431
			246	347	449
			249	360	465

kd = 2.070
Not recommended
with pressures
greater than 45 psi



Note: when using this length to look up pressure losses in the dripline, only the flow going out of the emitters is used, and does not reflect true pressure loss during flushing. Pressure loss during flushing is self calculated in the cell below, or can be obtained from Geoflows Flushing spreadsheet.

Wasteflow PC 0.75 gph

Flow Rate vs. Pressure

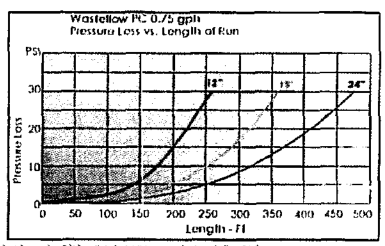
Pressure	Head	Dripline WFPC16-4-24	Dripline WFPC16-4-12
7-45 psi	16-103 ft	0.75 gph	0.75 gph

Maximum Length of Run vs. Pressure

Allows a maximum of 10 psi

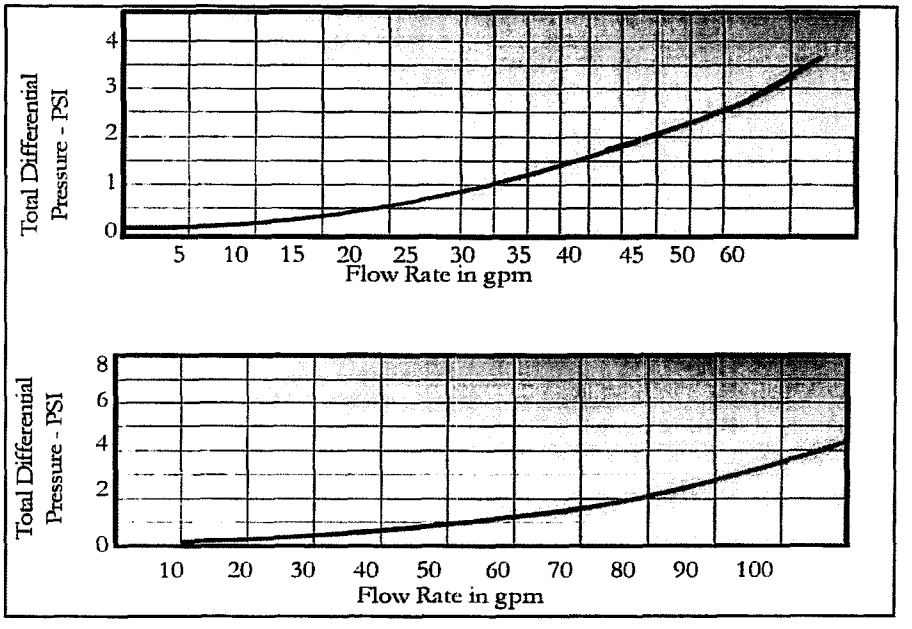
Pressure		Emitter Spacing		
psi	ft	12"	18"	24"
[illegible]	23.10 ft			
15 psi	34.65 ft	140	200	267
20 psi	46.20 ft			
25 psi	57.75 ft	208	280	383
30 psi	69.30 ft			
35 psi	80.85 ft	251	350	482
40 psi	92.40 ft			
45 psi	103.95 ft	384	407	532

kd = 2.070
Not recommended
with pressures
greater than 45 psi



Note: when using this length to look up pressure losses in the dripline, only the flow going out of the emitters is used, and does not reflect true pressure loss during flushing. Pressure loss during flushing is self calculated in the cell below, or can be obtained from Geoflows Flushing spreadsheet.

BioDisc Filters



Schedule 40 PVC Plastic Pipe

(Pounds per square inch (PSI) per 100 ft. of pipe
The pipe is Schedule 40 ASTM D1785, D2672, D1784

	½"		¾"		1"		1 ¼"		1 ½"		2"		2 ½"		3"		4"		6"	
Flow GPM	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI	Velocity FPS	Pressure Drop PSI
1	1.05	0.43	0.6	0.11	0.37	0.03														
2	2.11	1.55	1.2	0.39	0.74	0.12	0.43	0.03												
3	3.17	3.27	1.8	0.83	1.11	0.26	0.64	0.07	0.47	0.03										
4	4.22	5.57	2.41	1.42	1.48	0.44	0.86	0.11	0.63	0.05										
5	5.28	8.42	3.01	2.15	1.86	0.66	1.07	0.17	0.79	0.08										
6	6.33	11.81	3.61	3.01	2.23	0.93	1.29	0.24	0.95	0.11	0.57	0.03								
8	8.44	20.1	4.81	5.12	2.97	1.58	1.72	0.42	1.26	0.2	0.76	0.06	0.54	0.02						
10	10.55	30.37	6.02	7.73	3.71	2.39	2.15	0.63	1.58	0.3	0.96	0.09	0.67	0.04						
15			9.02	16.37	5.57	5.06	3.22	1.33	2.36	0.63	1.43	0.19	1.01	0.08	0.65	0.03				
20					7.42	8.61	4.29	2.27	3.15	1.07	1.91	0.32	1.34	0.13	0.87	0.05				
25					9.28	13.01	5.36	3.42	3.94	1.63	2.39	0.48	1.67	0.2	1.08	0.07				
30					11.14	18.22	6.43	4.8	4.73	2.27	2.87	0.67	2.01	0.28	1.3	0.1				
35							7.51	6.38	5.52	3.01	3.35	0.89	2.35	0.38	1.52	0.13	0.88	0.03		
40							8.58	8.17	6.3	3.88	3.82	1.14	2.64	0.48	1.73	0.17	1.01	0.04		
45							9.65	10.16	7.09	4.8	4.3	1.42	3.01	0.6	1.95	0.21	1.13	0.05		
50							10.72	12.35	7.88	5.83	4.78	1.73	3.35	0.73	2.17	0.25	1.26	0.07		
60									9.46	8.17	5.74	2.42	4.02	1.02	2.6	0.35	1.51	0.09		
70									11.03	10.87	6.69	3.22	4.69	1.36	3.04	0.47	1.76	0.12		
80											7.65	4.13	5.36	1.74	3.47	0.6	2.02	0.16		
90											8.6	5.13	6.03	2.16	3.91	0.75	2.27	0.2		
100											9.56	6.23	6.7	2.63	4.34	0.91	2.52	0.24	1.11	0.03
125											11.95	9.42	8.38	3.97	5.42	1.38	3.15	0.37	1.39	0.05
150													10.05	5.56	6.51	1.93	3.78	0.51	1.67	0.07
175															7.59	2.57	4.41	0.68	1.94	0.09
200															8.68	3.4	5.04	0.9	2.22	0.12

Note: Values in shaded areas are at velocities over 5 feet per second and should be selected with caution.

Note: Values in shaded areas are at velocities over 5 feet per second and should be selected with caution.

TechData

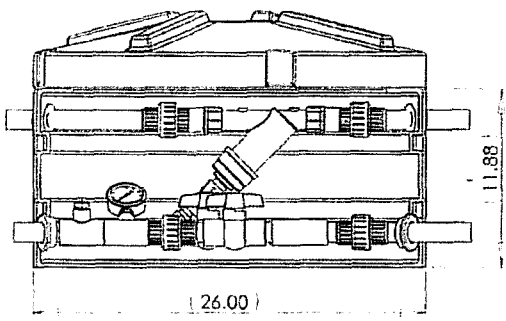
Drip Irrigation
Management Systems

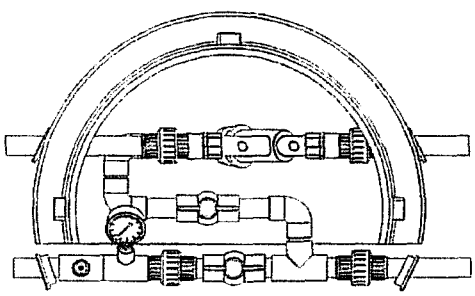
PDS-MS-1-AUT, PDS-MS-1.5-AUT, PDS-MS-2-AUT, PDS-MS-1-MAN, PDS-MS-1.5-MAN, PDS-MS-2-MAN

Features

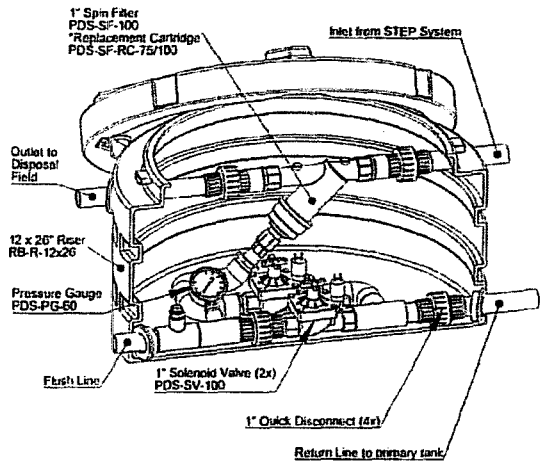
- Automated management system utilized to provide back washing of drip field and spin filter
- Pre-assembled with all necessary components
- Automated must be used in conjunction with a PDS-CNTR controller. Manual requires timed controller.
- Flow rates of 10 gpm - 28 gpm
- Pressure loss between inlet and outlet:

Flow (gpm)	10	15	20	25	28
Psi loss	3.5	7.2	12	18.5	24

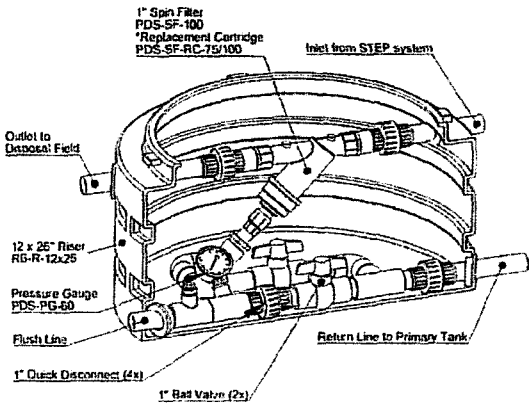




Automated Drip Management



Manual Drip Management



Manual models include:

- Spin filter
- Two ball valves
- Pressure gauge
- Air release valve
- Quick disconnects
- 26" x 12" polyethylene basin and lid

Automated models include:

- Spin filter
- Two solenoid valves
- Pressure gauge
- Air release valve
- Quick disconnects
- 26" x 12" polyethylene basin and lid

Warranty for Defects in Material and Workmanship

- All components in system - 1 Year

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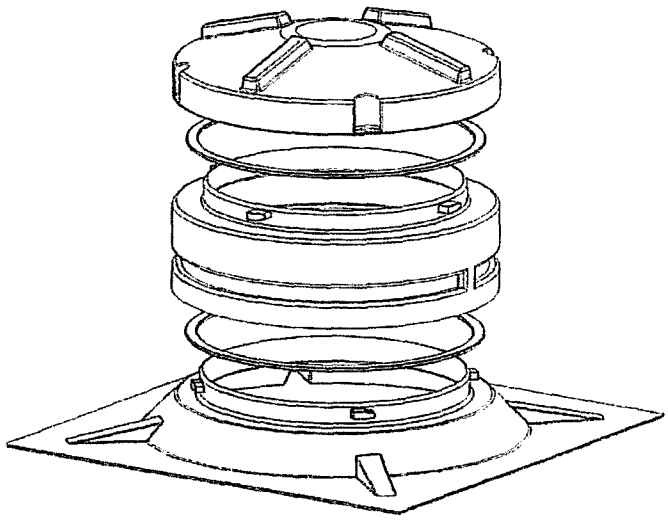
Risers & Lids

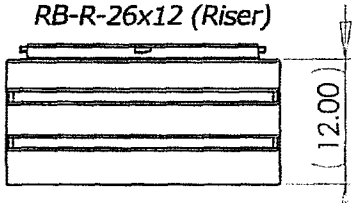
(26" Diameter)

Features:

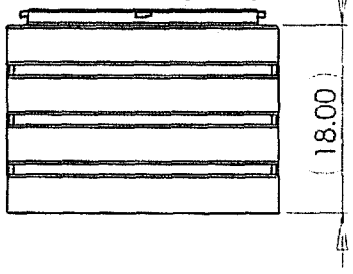
- *Patented 26" polyethylene risers*
- *All components include twist lock tabs*
- *Tamper resistant fasteners included with each lid*
- *Tested to withstand up to 2500 lb wheel load*
- *May be cast-in or retrofit to any concrete tank*



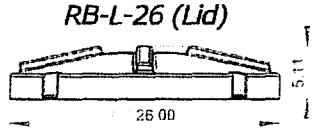
RB-R-26x12 (Riser)



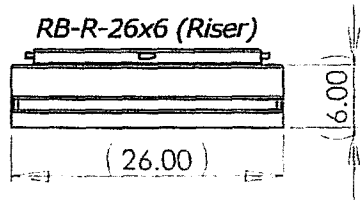
RB-R-26x18 (Riser)



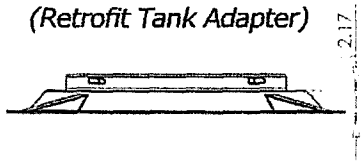
RB-L-26 (Lid)

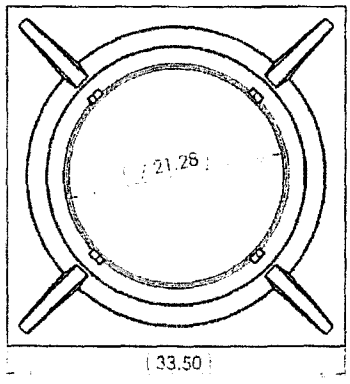


RB-R-26x6 (Riser)



RB-RTA-26x2
(Retrofit Tank Adapter)





Materials:

Risers and lids

- *High density non-corrosive polyethylene plastic*
- *Stainless steel screws*
- *Neoprene gasket*

Warranty for Defects in Material and Workmanship

- *Risers and Lids - 2 Years*

IMPORTANT:

- *When adding risers together for deeper installations Quanics does not recommend exceeding a maximum depth of 50".*
- *Neoprene gaskets must be installed as per instructions*
- *To prevent unauthorized entry install all tamper resistant fasteners as per instructions*

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Drip Irrigation (Packages)

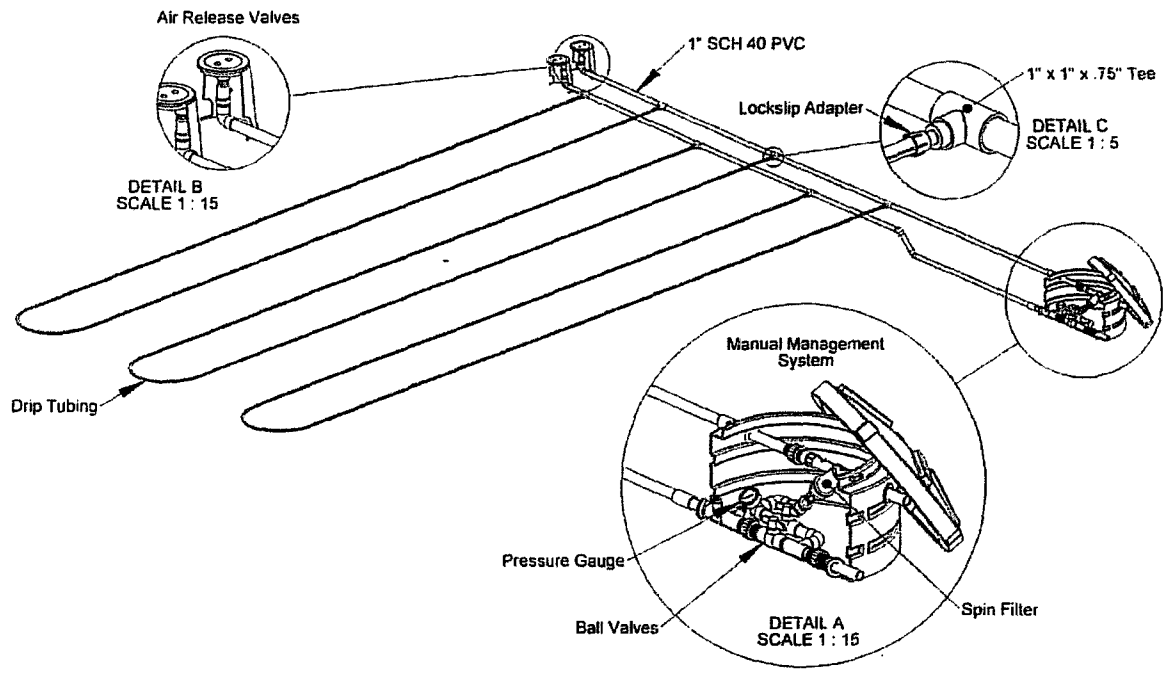
PDS-DI-500, PDS-DI-1000, PDS-DI-1500, PDS-DI-2000, PDS-DI-2500, PDS-DI-3000, PDS-DI-3500, PDS-DI-4000

Models include:

- *Drip tubing (model PDS-DI-500 = 500 linear ft)*
- *Manual management system*
- *Air release valves*
- *Valve boxes*
- *Drip tube fittings*
- *May be customized with automatic management*

Specifications	Pressure compensating tubing
Tubing diameter	1/2"
Rootgaurd	Yes
Emitter performance	0.53 gph @ 7-60 psi
spacing	2'
material	Low density polyethylene
Effluent quality req.	Secondary

Single zone field layout example
Dual zones layout available online



Warranty for Defects in Material and Workmanship

- *1 Year*

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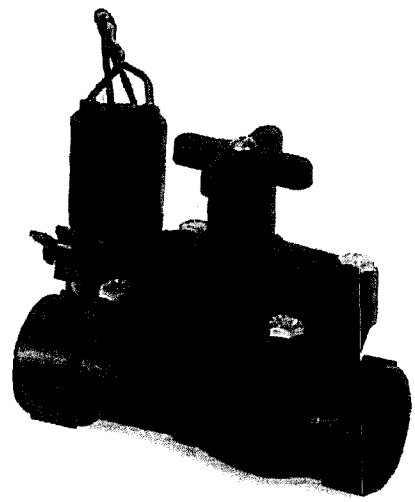
Disposal Systems
Drip Irrigation (Accessories)

PDS-SV-100

Features
- Electrically operated solenoid valve used to flush dripfield and spin filter
- Normally closed valve
- Dual ported design greatly minimizes clogging
- Porting design permits pressure equalization thereby preventing diaphragm stretching
- Type UF wire, UL listed, is recommended for all hookups: 5.5 VA at 24V a.c./60 Hz



Materials

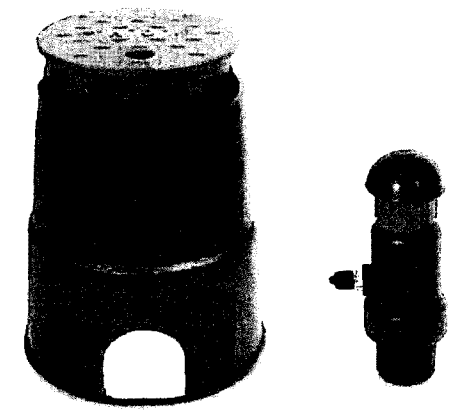
Body
- Waterproof molded epoxy resin
- Complies with NEC Class II circuit requirements for 24 a.c. operation
- Actuator is Teflon coated stainless steel and brass with a molded in place rubber exhaust port seal
- Stainless steel spring assures positive seating
- High strength plastic glass-filled body and cover with stainless steel 1/4" cover bolts and mating brass body inserts

Diaphragm
- Nylon fabric reinforced Buna-N rubber
- Grooved rib interlocks with cover and body

Warranty for Defects in Material and Workmanship
- Solenoid Valve - 1 Year

PDS-AVB, PDS-VB-100

Features
- 1" vacuum breaker and air vent box are installed at the high points of the supply and return manifold
- Required to prevent back siphoning of soil back into each drip emitter
- Each vacuum breaker includes a Schrader Valve for pressure reading
- Air vent box includes green removable lid



Materials

Vacuum Breaker
- Molded plastic
- Connected with a 3/4" hose thread
- Inlet size shall be a 1" male pipe thread
- Internal ball constructed of low density plastic
- Internal seat constructed of vinyl

Air Vent Box
- Molded Plastic

Warranty for Defects in Material and Workmanship
- Vacuum Breaker - 1 Year
- Air Vent Box - 1 Year

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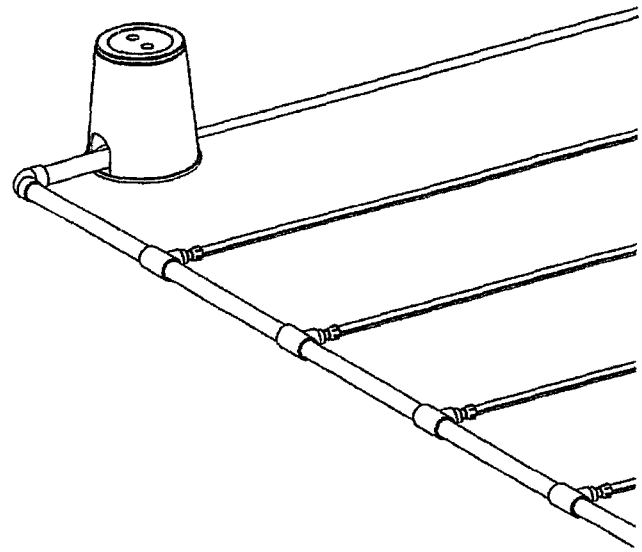
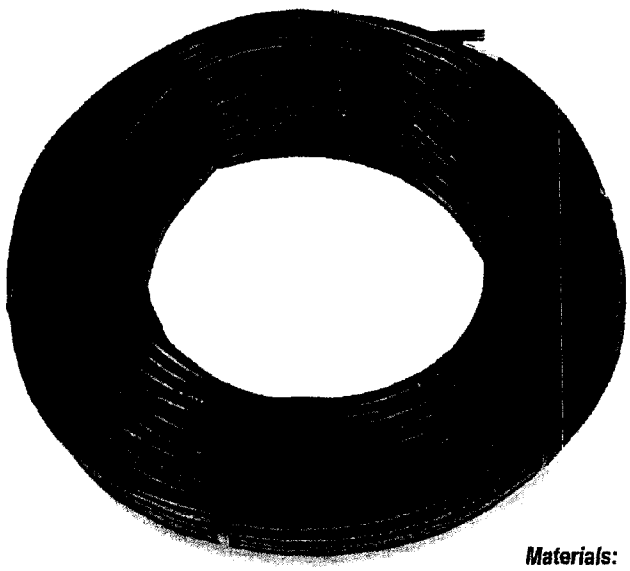
Drip Irrigation (Tubing)

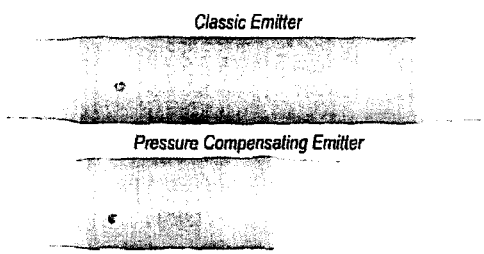
PDS-DT-12, PDS-DT-12-PC, PDS-DT-24, PDS-DT-24-PC



Features

- *Flexible 1/2" polyethylene drip tubing for uniformly distributing secondary quality effluent*
- *Drip tubing includes ROOTGUARD® protection and Ultra-Fresh DM50 bactericide*
- *Emitters spacing - PDS-DT-12 = 12", PDS-DT-24 = 24"*
- *Non-pressure compensating emitter delivers 1.3 gph at 20 psi*
- *Pressure compensating emitters delivers 0.53 gph at 7-60 psi*





Materials:

Drip Tubing

- *Nominal sized one-half inch linear low density polyethylene tubing*
- *Bactericide incorporated into inside layer of tubing*
- *Turbulent flow drip emitters bonded to the inside wall molded from virgin polyethylene resin*
- *Each emitter impregnated with Treflan to prevent root intrusion*

Warranty for Defects in Material and Workmanship

- *Drip tubing - ten years when installed below ground*
- *Drip tubing - two years when installed above ground*
- *ROOTGUARD - Products containing the ROOTGUARD protection are warranted to be free from root intrusion for a period of ten years from the date of purchase*

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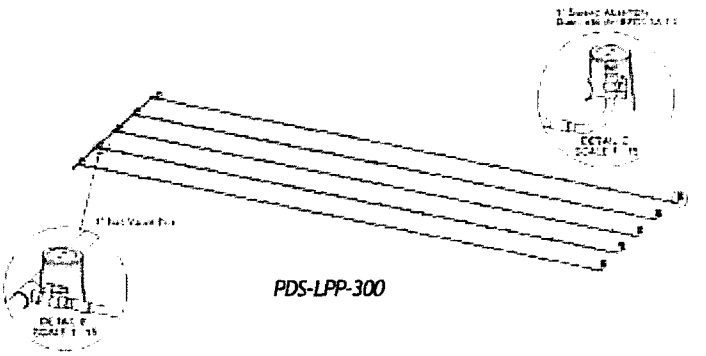
Pressure Dispersal Systems

Low Pressure Pipe

PDS-LPP-300, PDS-LPP-400, PDS-LPP-600, PDS-LPP-900



PDS-LPP-300

Models include:

- *Lateral assembly sections*
- *Ball valve assemblies*
- *Sweep assemblies*
- *Stand pipe*
- *Orifice shields*

Not included:

- *Septic and dosing tanks*
- *Supply line from pump (can be ordered as custom part)*
- *STEP package (refer to Quanics STEP package options)*
- *Gravel*

Specifications	PDS-LPP-300	PDS-LPP-400	PDS-LPP-600	PDS-LPP-900
Treatment	600 gpd Class I soil 450 gpd Class II soil	600 gpd Class I-II soil 450 gpd Class I-II soil	600 gpd Class II soil 450 gpd Class II-III soil	600 gpd Class II-III soil 450 gpd Class II soil
Laterals	375 linear ft.	500 linear ft.	500 linear ft.	500 linear ft.
Quantity	5	8	10	15
Length per	60'	50'	60'	60'
Sections	5'	5'	5'	5'
Orifices per section	1	1	1	1
Sweep assemblies	1	1	1	1
Orifices	60	80	120	180
Diameter	5/32"	5/32"	5/32"	5/32"
quantity per line	12	10	12	12
Piping				
Manifold	1.5" sch 40 PVC	1.5" sch 40 PVC	1.5" sch 40 PVC	1.5" sch 40 PVC
Laterals	1.0" sch 40 PVC	1.0" sch 40 PVC	1.0" sch 40 PVC	1.0" sch 40 PVC

Flow per hole

Pressure Head	Flow
1 Foot	0.29 gallons per minute
2 Feet	0.41 gallons per minute
3 Feet	0.50 gallons per minute
4 Feet	0.58 gallons per minute
5 Feet	0.64 gallons per minute

Warranty for Defects in Material and Workmanship

- *1 Year*

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8. Soil Information

WPC Soil Map
&
Soil Descriptions

(To be submitted later)